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a prospectus
for resource
and economic
development
in the yukon
and the
northwest
territories

department of indian affairs
and northern development
government of canada

NORTH OF 60 PROSPECTUS

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AN INTRODUCTION TO CANADA NORTH OF 60

Like the churning waters of an Arctic River released from winter's ice, the natural resources of Canada North of 60 are now being revealed. It is a breathtaking, exciting and challenging sight.

The riches discovered so far are immense. As the turn of the drill, the scoop of the shovel, uncover yet more wealth the full size and value of these resources can only be imagined. To those who have already taken the risks and successfully invested in the development of the region the rewards have been great. Yet Canada North of 60 has barely been touched.

Today, the Canadian north is one of the most inviting regions on earth for the daring, for the entrepreneur looking for challenging enterprises — the international corporation looking for major sources of resource material, the small businessman pioneering a new venture in a northern community, the young and curious, filled with the spirit of adventure inherited from other generations who opened up the North American frontiers of the 18th and 19th centuries.

The frontier opportunities North of 60 are unlimited, no matter what field of endeavor, be it resource development, social improvement, research. For the investor, the northern horizons are vast. Minerals, oil, gas, forests, water, land, these are the great potentials. All forms of transportation are open for expansion. The service industries to meet the local needs of the major enterprises — supply houses, hotels, restaurants, entertainment, recreation — are in ever increasing demand.

The Government of Canada has opened the door to its northern regions. It invites the potential investor, the potential citizen of the North to come in and look at the possibilities.

The world's newest frontier begins at the 60th parallel, a line of latitude marking the boundary of the Yukon and the Northwest Territories and the provinces of British Columbia, Alberta, Saskatchewan and Manitoba.

It is a hard frontier, a land of great extremes, tremendous distances and harsh climate. The Yukon Territory covers an area of 205,300 square miles. It is a rugged country, of great mountain peaks, deep valleys and gushing streams. The Northwest Territories, covering 1,253,000 square miles, is a land of mighty rivers, lonely barrens, innumerable lakes and gigantic islands locked in ice.

Canada North of 60 has for centuries been a land of mystery and romance. But in the last decade, as the lid of this great treasure chest is lifted, a new face of the North has emerged.

On this new map is Pine Point, site of one of the world's largest base metal operations. Mary River, on Baffin Island, is the place name for what is probably the world's biggest deposit of high-grade iron ore. The Mackenzie River Delta and neighboring Arctic Islands are regarded as the likely location of one of the world's largest pools of oil. Historic Coppermine, where the explorer Samuel Hearne looked in vain for the legendary Indian copper mines is now, 300 years later, the centre of one of Canada's biggest claim staking and mine development programs.

The increase in mineral production North of 60 has been dramatic, climbing from \$33,897,819 in 1954 to more than \$200,000,000 in 1970.

Yesterday, the extremes, the distances, the climate stood as major obstacles before resource development. Today, with the new technology, new forms of transportation and communication, and a spirit of adventure and challenge among the Canadian people, these obstacles are being rapidly overcome.

Canada North of 60 is a land of discovery for most Canadians. Generations have grown up under the belief that this region was nothing but a worthless land of ice, snow and bitter cold, and inhabited only by the Eskimo and the polar bear. These myths were perpetuated by the first explorers from Europe, who, in their search for the elusive Northwest Passage to the Orient, found themselves stranded on the forlorn shores of Hudson Bay and the islands of the Arctic Archipelago.

Their journeys were not in vain; they found the trading of furs with the indigenous people highly profitable. Over the years they mapped the rivers, the lakes and the coastlines, but beyond the wildlife resource, they never discovered the true potential of northern Canada.

The Canadian north today presents a dramatic picture. The skies are alive with aircraft bearing men and material into the region. Railway steel and highway right-of-way move ever further northward. Whole communities are springing up overnight on the shore of a northern river, or on the rolling tundra, as bulldozer and dynamite uncover new mineral wealth.

Yesterday, it took weeks, and even months, by foot, or canoe, to reach Canada North of 60. Today, it is but a few hours' flying time from the metropolises of North America and Europe. The once crude shelter against the Arctic wind and cold has given way to the modern, comfortable house. The formerly isolated camp is now a warm, fully-equipped settlement, just a twist of a radio dial away from civilization. What used to be a meal of hardtack and tea is now a sizzling steak and fresh salad greens flown in from the south.

The excitement of the Klondike gold rush of the 1890s, which saw many fortunes made – and, many more dreams drowned in the sluice boxes of the Yukon mining camps – has now returned to the Territory. The discovery and development of huge deposits of asbestos, tungsten, silver and base metals have brought new prosperity to this fabled land.

Gold sent the mineral seekers to the Northwest Territories in the 1920s and 1930s, but it is copper, silver, lead and zinc and other valuable metals that are exciting the prospectors and developers. Those in search of oil and gas have moved down the Mackenzie River from their original discovery at Norman Wells to the river delta where what is believed to be one of the world's biggest pools of oil is being outlined.

Modern-day mariners are determined to establish permanently a shipping route through the Northwest Passage to move the riches of the Canadian north to the markets of the world. Ice-smashing tankers and revolutionary new ice-breakers are being assembled to pioneer this venture.

As the custodian of the resources North of 60 the Government of Canada is actively encouraging these developments. It had formulated a series of policies and programs designed to assist the private investor in utilizing his capital and his individual talents in the Territories.

These policies and programs, as they relate to the effective management of oil and gas, mineral, water, forests and land resources, and to the economic development of the Yukon and the

Northwest Territories, are the responsibility of the Northern Economic Development Branch of the Department of Indian Affairs and Northern Development.

In harnessing the natural resources North of 60, the Government of Canada is concerning itself with another resource that is the key to the whole development of the region, that is the 40,000 residents of the two Territories.

For years the indigenous people, representing more than one-half the total population of the region, were neglected by all levels of government. The Indian and Eskimo people have, until recent years, been deprived of opportunity. However, the Federal Government has sought to correct this social problem and has embarked on a number of major programs designed to give the indigenes a place in the economic development of the Territories.

The Government began by providing the Indians and Eskimos with proper shelter, good health care and education. Much has been done, but much more has yet to be accomplished in these fields.

Having provided the indigenes with the opportunities for an education, the Federal Government is now giving top priority to ensure that they can participate in the economic growth of the Territories. Government already is a major employer of indigenes, and has as stated policy the objective of increasing the proportion of its employees which are indigenes as rapidly as possible.

At the same time the Federal Government is seeking to encourage private industry to employ Northern residents, particularly Indian and Eskimo personnel, in not only resource development, but in secondary industries as well, such as tourism and manufacturing.

The Federal Government, realizing the high risks involved in investment North of 60, has a broad program of incentives to assist the private investor, ranging from small business loans to airport and road construction and mineral development.

Programs of direct financial support and indirect capital investment are available for those projects which show the promise of profitable return to both public and private sectors. The Government has already demonstrated a willingness to enter into a partnership with industry in undertaking high-risk exploration programs of a unique nature. Such is its commitment to the development of Canada north of the 60th parallel.

In preparing this Prospectus for the resource and economic development of the Yukon and Northwest Territories, the Northern Economic Development Branch has drawn together the basic information which it considers valuable material of interest to the potential investor.

The Prospectus will be maintained as a current working document by the Branch. The latest information on resource and economic development North of 60 will be forwarded regularly to Prospectus holders.

The Northern Economic Development Branch, in carrying out Government policies and programs, has been given the challenging assignment of bringing the Yukon and Northwest Territories into the economic mainstream of the country. In meeting this assignment it hopes, through this Prospectus, to encourage private investors to participate in this great national venture — and, ultimately, to share in the rewards.



northern economic
development branch
department of indian affairs
and northern development
government of canada

INCENTIVE PROGRAMS NORTH OF 60

1-1.1 GENERAL

The Federal Government has developed a series of incentive programs designed to aid both companies and individuals in exploration and development activities North of 60. These programs are administered by the Northern Economic Development Branch of the Department of Indian Affairs and Northern Development.

The Branch has been given the responsibility for the effective management of the oil and gas, mineral, water, forest and land resources, and for the economic development of the Yukon and the Northwest Territories generally.

While development of a general or balanced nature is considered necessary to ensure continued economic growth, the key to any such development lies primarily in the mining and oil and gas sectors. It is the Government's intention, however, to use any success in these areas to create opportunities in other fields such as tourism, fish and game hunting and related industries, through such programs as the new Small Business Loan Funds for the two Territories.

In creating such opportunities, the Federal Government is providing special incentives to the individual resident of the Yukon and the Northwest Territories. Education is playing a most important role in assisting the indigenes of the Territories to participate in the economic development of the two regions. Federally-operated schools and vocational training institutions are teaching new skills and broadening the knowledge of Territorial residents.

Every effort is made by the Federal Government to maintain flexibility in its incentive programs. If no existing program is available to meet a particular situation, assistance may be provided because of the potential merits of the projected development.

For example, to assist in the opening of the Pine Point lead-zinc mines near Great Slave Lake the Federal Government assisted with the construction of a 420-mile railway link, at a cost of \$86,000,000. In addition, the Government constructed a 35,000 horsepower hydro-electric plant on the Taltson River, 150 miles from Pine Point, at a cost of approximately \$9,000,000.

The Government also constructed an all-weather road from the Mackenzie Highway to Pine Point, and assisted in the establishment of a townsite.

A further example of the Government's flexible approach North of 60 was the formation of Panarctic Oils Limited. The Government joined with a number of private companies as an equity partner to provide more than \$9,000,000 for a 45% share in a program of exploration for oil and gas in the Arctic Islands.

1-2.1 NORTHERN ROADS NETWORK PROGRAM

The Northern Roads Network Program was approved by the Federal Government in 1965 and provided for an expenditure of \$10,000,000 each year for ten years to establish a systematic road network designed for longterm use in the Yukon and the Northwest Territories.

The program involves the development of communication roads to provide a primary road network in the area, and lateral roads which lead from this primary network to areas where resource exploration, development or exploitation are taking place.

For purposes of classification and costing, lateral roads are considered in the following categories:

- * Tote Trails
- * Initial Access Roads
- * Permanent Access Roads
- * Resource Development Roads

1-2.1.1 Tote Trails

Tote trails are low standard roads designed to provide access to a resource project in the exploration or development stage. Winter roads are included in this category. These trails may be constructed to whatever standard that will provide suitable access to the property. Assistance in the construction of tote trails may be up to 50 % of the cost of construction but shall not exceed \$20,000.

This program is administered by the Territorial Commissioners for the Yukon and Northwest Territories and they must approve the location of any tote trail before financial assistance can be authorized.

Further information and applications for tote trails are available from the Commissioner of the Northwest Territories or the Commissioner of the Yukon.

1-2.1.2 Initial Access Roads

Initial access roads are low standard roads designed to provide access to a resource project which is in the exploration or development stage. This category is intended for cases where, because of length, terrain or difficulty of construction, total cost is such that the \$20,000 available under the tote trail category would be insufficient.

Minimum desirable road standards under this category are:

Desirable design speed	— 25 mph (not related to minimum standards shown)
Width of Right of Way	— 50 feet
Width of Travelled Surface	— 12 feet
Width of Shoulders	— nil
Bridge Design	— H20-S16
Bridge Width and Height	— 12 feet and 12 feet 6 inches
Maximum gradient	— 14%
Maximum curvature	— 35°

Particular sections of the road may be built to lesser standards where difficult terrain makes strict adherence to the above standards excessively costly.

The amount of Federal assistance will not exceed 50% of the actual road cost, or 5% of the company's expenditure on exploration or development of the project whichever is the lesser. The maximum yearly contribution is limited to \$100,000 if the project is exploratory in nature and \$500,000 if the project is primarily development. The location of the initial access road must be approved by the Minister of Indian Affairs and Northern Development.

Further information and applications for financial assistance are available from the Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

1-2.1.3 Permanent Access Roads

Permanent access roads are higher standard roads designed to provide permanent access from an existing permanent road to a resource project which has been brought to the pre-production or production stage. The minimum desirable road standards are:

Desirable design speed	– 50 mph (not related to minimum standards)
Width of right of way	– 100 feet
Travelled surface	– 18 feet
Width of shoulders (each)	– 3 feet
Bridge design	– H20-S16
Bridge width and height	– 24 feet and 14 feet 6 inches
Maximum gradient	– 10%
Maximum curvature	– 20°

Particular sections of the road may be built to lesser standards where difficult terrain makes strict adherence to these standards excessively costly.

The Department of Indian Affairs and Northern Development may authorize a contribution of up to 2/3 of the cost of construction but not exceeding 15% of the actual capital invested by the company prior to the start of commercial production or exploitation, or \$40,000 per mile, whichever is lesser.

The location of the road must be approved by the Minister of Indian Affairs and Northern Development.

Further information and applications for financial assistance are available from the Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

1-2.1.4 – Resource Development Roads

Resource development roads are financed completely by the Federal Government and are designed to provide permanent access to two or more particular resource development centres. For example, when two or more mines have reached the production stage or are committed to do so, the Federal Government may build a resource development road from the nearest permanent road to the area where the mining is taking place.

The minimum desirable road standards are:

Desirable design speed	– 50 mph (not related to minimum standards)
Width of right of way	– 100 feet
Travelled surface	– 18 feet

1-2.1.4

Width of shoulders (each)	— 3 feet
Bridge design	— H20-S16
Bridge width and height	— 24 feet and 14 feet 6 inches
Maximum grade	— 10%
Maximum curvature	— 20°

1-2.1.5 Area Development Roads

Area development roads are roads of relatively low construction standard into or through an undeveloped region of favourable natural resource potential for the purpose of fostering new growth in the economic activities of the territory.

The Minister of Indian Affairs and Northern Development may approve construction of an area development road on recommendation from the Interdepartmental Roads Appraisal Committee and if he is satisfied that the road will provide access to an area having a favourable natural resources potential.

Construction of an area development road is the responsibility of the Federal Government. Maintenance costs are shared 85% by the Federal Government, and 15% by the Territorial Government.

The minimum desirable road standards are:

Desirable design speed	— 50 mph (not related to minimum standards)
Width of right of way	— 100 feet
Travelled surface	— 18 feet
Width of shoulders (each)	— 3 feet
Bridge design	— H20-S16
Bridge width and height	— 24 feet and 14 feet 6 inches
Maximum grade	— 10%
Maximum curvature	— 20°

1-3.1 – NORTHERN MINERAL EXPLORATION ASSISTANCE PROGRAM

The Northern Mineral Exploration Assistance Program is designed to encourage the investment of domestic risk capital in both mineral and oil and gas exploration North of 60.

At the same time it seeks to reach those source of capital which up to now have been unable to take advantage of the write-offs allowed under the Income Tax Act to those engaged in the exploration and development of minerals and petroleum.

In effect, recipients of the assistance grant may receive comparable benefits to those obtainable by companies which can now do so under paragraphs (a) and (b) of subsection (3b) of Section 83A of that Act.

Subsection (3b) of Section 83A of the Income Tax reads, "A corporation whose principal business is

- (a) production, refining or marketing of petroleum, petroleum products or natural gas, or exploring or drilling for petroleum or natural gas;
- (b) mining or exploring for minerals;

may deduct in computing its income under this Part for a taxation year, the lesser of

- (f) the aggregate of such of
 - (i) the drilling and exploration expenses, including all general geological and geophysical expenses, incurred by it on or in respect of exploring for drilling for petroleum or natural gas in Canada, and
 - (ii) the prospecting, exploration and development expenses incurred by it in searching for minerals in Canada

as were incurred after April 10, 1962, and before the end of the taxation year, to the extent that they were not deductible in computing income for a previous taxation year, or

- (g) of that aggregate, an amount equal to its income for the taxation year."

if deductions had not been allowed under other sections of the Act."

Applications

Applications for Northern Mineral Exploration Assistance Grants, when completed to the satisfaction of the Minister, are dealt with in the order in which they are received whether or not the grant, if approved, is made in the same fiscal year as the application. A grant may not exceed 40% of the cost of an approved exploration program. Provision has been made for the Department to make payments, over an unspecified number of years, up to an aggregate ceiling of \$9,000,000.00.

Applicants for grants must, if individuals, be over 21 years of age, Canadian citizens and own beneficially the holdings upon which it is proposed to carry out an exploration program or otherwise be entitled to do exploration work on these holdings by virtue

1–3.1

of a lease or option agreement. The term holding is used for convenience as it can encompass a mineral claim, a lease, or permit to explore. Private companies applying for a grant must be at least 50% beneficially owned by Canadian citizens and incorporated in Canada, or in a Province of Canada. Public companies must be incorporated in Canada, or in a Province of Canada. They must also have their common shares listed on a Canadian stock exchange or have them offered for sale to the public in Canada through a registered securities dealer.

Provision is also made in the Regulations for the making of grants to companies incorporated in Canada, or in a Province of Canada, formed for the purpose of and engaged in exploring for minerals in Northern Canada where the company is the beneficial owner of the holdings over which the exploratory program is to be carried out, or it has a lease or option agreement to work on these holdings, and not more than 15% of its issued common shares are beneficially owned in the aggregate by one or more companies of the type described in paragraph (a) or (b) of subsection (3b) of section 83A of the Income Tax Act.

Assessment

An applicant for a grant must submit all the information required to assess his eligibility for assistance, and must, in the event that an exploratory program which will not be completed in the same fiscal year, break down his program into stages with estimates of costs to be incurred during each stage. This will facilitate the estimating of the amount of funds required in future years.

Assignment

No assignment or transfer of holdings or of an interest in them may be made without Ministerial approval once an exploratory program has been approved for a grant.

Payment

After a grant has been approved, no payment or part payment of the grant will be made until the completion of the entire exploration program or a pre-approved stage thereof. There is, however, a provision that where it has become evident, as a result of preliminary exploration that further work would result in dissipation of funds, a proportional payment may be made based on the expenditures incurred up to the time of cessation of the program.

Statements

Recipients of grants are required to submit a statement of their program expenditures within ninety days of the completion of an exploratory program or of a pre-approve stage thereof. All statements of expenditure must be verified by statutory declaration and be accompanied by a full report containing details of all information gained as a result of the expenditures made.

Public Information

As public funds are involved, provision is made for information obtained on holdings as a result of an exploration program to be made public two years after the completion of the program.

Repayments

A grant is not subject to repayment if the recipient is notified by the Minister that, in his opinion, no indication has been found of the presence of oil, gas, or other minerals in quantities likely in the future to permit production for gain as a result of the exploratory program.

Grants become repayable on the first anniversary of the date on which production for gain begins, the date of which is normally established as being three calendar months following the official date of the mine opening announced by the recipient. The rate of annual repayment will not be less than 10% of the outstanding grant, together with interest. The rate of interest as a percentage rate will be equal to 2 plus the average of the interest rates stated on the face of long term Government of Canada Bonds outstanding during the calendar year preceding the year in which the payment is due. In the case of a recipient being a public company whose common shares are quoted on a Canadian stock exchange, if the Minister and the recipient of the grant agree, the issue to Her Majesty in right of Canada of common shares having an aggregate market value equal to the amount owing on the date of the agreement will be accepted. A repayment may also be made partly in cash and, by agreement, partly by issuing common shares. In the event that full repayment in part common shares and part cash is not made in one transaction not less than 10% may be paid as a first instalment of the outstanding part of the grant with a similar amount and interest on each subsequent instalment. A recipient may repay a grant in full at any time without notice or bonus.

Provision is made, where in the opinion of the Minister, economic circumstances justify a change in the rate of repayment of a grant, to increase the amount of the instalments to the paid and power is also given to decrease the amount of the instalments and reduce the rate of interest payable. The former would likely occur where the mine operated at a considerably higher profit level than initially anticipated while the latter would apply in the converse situation. Further, because of new discoveries richer, and nearer centres of consumption, an operation might cease to be profitable in which event the Minister may forgive the unpaid balance of the grant in whole or in part together with interest thereon.

Representation

No person may represent that the approval of or making of a grant connotes Government sponsorship of his company. This provision is to avoid unintentionally misleading the public or company subscribers into believing that Government assistance presupposes the presence of economic mineral deposition on any of the holdings described in the applicant's application.

Breaches

Should a recipient be in breach of the regulations, he will be required to repay the amount of grant paid to him in full with interest at a rate of 10% per annum from the date or dates of the advance of the money. Further, he will be prohibited from obtaining a grant in the future.

General

Applicants are considered on a first-come basis. Copies of the Northern Mineral Exploration Assistance Regulations and application forms are available from the Northern Economic Development Branch, Department of Indian Affairs and Northern Development.

1-4.1 PROSPECTOR'S ASSISTANCE PROGRAM

Prospectors may be provided with grants of up to \$900 per year under this program to assist in outfitting and transportation costs to their area of activity. A total of \$60,000 is available annually for both Territories. Two thirds of the grant to each prospector may be provided in advance. The program is designed to assist individual prospecting activities but two or more prospectors may pool their resources to reduce charter flying costs and similar common expenses. In this case however each prospector is eligible for the maximum grant.

The program is administered by a screening board and every application must be approved by this board. Applications are considered on a first-come basis. A prospector must spend a minimum of 60 days in the field and is required to submit a diary and report to receive final payment.

Applications for assistance may be obtained from any Mining Recorder's office in the Territories or from the Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

1–5.1 NORTHERN RESOURCE AIRPORTS PROGRAM

Resource airports are divided into two categories:

- (a) Exploratory airports – built to assist initial exploratory work or to assist in locating mineral or other natural resources.
- (b) Pre-production airports – built to assist in the pre-production or early production phases of resource exploitation. These are constructed to a higher standard than exploratory airports.

Cost sharing agreements for the establishment of the above types of airport may be made between the Federal Government and a natural resource development company, a private tourist or recreational enterprise or an established air carrier.

Both categories of airport are to be built to the standards considered adequate by the Federal Government's Department of Transport. The private company has the responsibility for construction, maintenance and operation of all airports constructed under this program. Such airports are to be available for public use at all reasonable times and are held by or are arranged to be transferred to the Federal Government. In certain cases landing fees may be charged by the company operating the airport to help defray airport maintenance. Approval for charging such fees must first be obtained by the company from the Department of Indian Affairs and Northern Development.

It is the policy of the Department to negotiate only with a single company or agency for the construction of a resource airport. If more than one company or agency is involved, it is suggested they form a single agency or syndicate to negotiate with the Government.

1–5.1.1 – Exploratory Airports

Exploratory airports are airstrips of minimum dimensions which serve specific resource sites at which one or more private companies are active. Such airstrips are constructed at the exploration phase of resource exploitation for the purpose of bringing in personnel, supplies and equipment. In other cases, their primary usage may be to provide access to a locality on behalf of one or more tourists entrepreneurs initiating recreational developments. Departmental participation in the construction of airstrips of this type is to be contingent upon the receipt of reasonable evidence that the area in question has a resource potential, and that the project itself is worthy of public assistance.

Such airstrips are built to the minimum standards considered adequate by the Department of Transport for their intended use.

The Department of Indian Affairs and Northern Development will pay fifty per cent of the cost of an individual exploratory airport up to a maximum Federal expenditure of \$20,000. Where the full cost of any such airstrip exceeds \$40,000, the private cost sharing interest will bear the full cost in excess of this amount. The annual Federal expenditure for airstrip construction assistance in the NWT and YT is expected to average out to \$160,000, depending on the pace of northern exploratory activity. It is the intention to spend roughly half of the total Federal amount in each of the Yukon and Northwest Territories during any single year.

1–5.1.1

Federal cost sharing may take place with a natural resource development company, a private tourist or recreational enterprise, or any established air carrier. The company concerned must be able to provide demonstrable evidence of its financial and general reliability and the Federal cost sharing must in all instances be directly connected with some form of natural resource development. The cost-sharing company – for the duration of its operational interest in the completed facility – shall make its exploratory aerodrome available for public use at all reasonable times.

Operation and maintenance will be the responsibility of the private interests concerned.

1–5.1.2 – Pre-production/Production Airports

These airports provide access to specific resources sites at which one or more companies are active at the pre-production or early production phase of resource exploitation (or at its equivalent for example in terms of development of tourist facilities). As such airports are being constructed primarily for the benefit of the companies concerned, Department of Indian Affairs and Northern Development participation in their construction will be contingent upon its receipt of good evidence from the company or companies involved that the operation in question is expected to be of reasonably long duration and public advantage.

An economic evaluation of the company's operations and of the general circumstances must be prepared in connection with the proposed airport prior to seeking Treasury Board's approval for the release of public funds for its construction. The project would be deemed undeserving of public financial assistance if the economic evaluation is unable to substantiate that the project itself will be significantly beneficial for the territory concerned.

While pre-production or early production phase airports do not have an important general aviation role, they nevertheless will have some role in this respect. In some cases, they may be required to serve multi-engine aircraft with a degree of regularity once the resources in their vicinity are being actively utilized. Because of this, provision should be made at the outset for the possibility that these airports, at their ultimate development, may become mainline airports. Thus, one runway should be located and designed so as to have an extendable length capable of accommodating larger aircraft and the Department of Transport is to be consulted on their design and construction.

The Federal Government may pay fifty per cent of the cost of a pre-production or early production phase airport up to a maximum Federal expenditure of \$100,000 per airport. The interested private company (or companies) will contribute the balance and will bear fully any airport construction costs exceeding \$200,000. The necessary funds will be sought by means of the inclusion of a specific item in the appropriate vote of the Department's estimates following receipt of a request for assistance.

Operation and maintenance of pre-production or early production phase airports will be the responsibility of the private interests concerned. These airports must be available for public use at all times. If it is decided subsequently that an airport of this category should be reclassified, the new responsibility for operation and maintenance will be determined by the terms of the new classification.

1–5.1.3 – Application of Policy

The following is a guide to eligible items for development which will be considered in each new airport or airport improvement which is approved.

Land Acquisition

- Resource airports in the Northwest Territories and Yukon Territory will always be built in areas where the surface rights to the land are held by or can be arranged to be transferred to the Federal Government. The Federal Government retains ownership of airports built under the provision of this policy. When a resource airport is reclassified, and operation and maintenance is taken over by a government agency, the company will have no claim to compensation for funds expended on construction operation or maintenance prior to its takeover.

Preparation of Site

- Eligibility of grading, drainage, and associated items of site preparation will be limited to the overall site preparation required for development in accordance with the approved plan. Grading in approach areas is eligible only to remove terrain which constitutes an obstruction.
- Eligible drainage work off the airport site includes drainage outfalls, drainage disposal, interception ditches, etc.

Runways

- Runways may be developed initially of turf, graded, gravelled or paved surfaces in accordance with approved specifications and current Department of Transport standards, depending upon the operational requirement in each case and subject to site consideration.
- Types of work eligible include reconstruction and resurfacing where such resurfacing is to increase the load bearing capacity of the runway or to provide a levelling course to correct major irregularities in the surface.

Taxiways

- Taxiways may be developed initially of turf, graded gravelled or paved surfaces in accordance with approved specifications and current Department of Transport standards depending upon the operational requirement in each case.

Aprons

- The construction of aprons will be eligible.

Roads and Sidewalks

- The construction of airport roads which are wholly within the airport boundaries will be eligible if justified on the basis of actual need for operating and maintaining the airport.

1–5.1.3

Fencing

- Boundary or perimeter fences for security purposes will be eligible.

Miscellaneous

- In addition to above items, such other items that may be specifically approved by the Department are eligible.

Eligibility of Repair Work vs. Maintenance Work

- Unlike repair work, maintenance work is not airport development and, therefore, is ineligible for inclusion in the Department's assistance program. Consequently, it will be necessary in many cases that a determination be made whether the work proposed is maintenance or repair.
- As a guide in making a judgment by the applicant in such matters, "maintenance" should be regarded as including any regular or recurring work necessary to preserve an existing facility in good condition, any work involved in the care or cleaning and incidental or minor repair work on existing airport facilities. On the other hand, repair work or reconstruction should be regarded as including any major work necessary to restore or preserve the facilities.

General

- After receipt and approval of a request for assistance, funds will usually be provided in the Departmental estimates for the year following but in some cases where there is a need for speedy action, the funds may be provided during the current fiscal year.

Project Requests

- A formal request in writing for assistance is necessary before any proposed project will be considered. The purpose of the request is to provide funds made available by Parliament. The request will be considered only as a preliminary notice of the applicants interest without obligating it or the Department to perform any work or expend any funds. Acknowledgement of the request does not imply that the proposed project will be approved or included in the program for any particular year.

Project Evaluation

- Each proposed airport project will be assessed to determine the amount of departmental funds that would be involved. The relative importance of any request for assistance is dependent upon the degree to which it can be shown that:

- (i) a given area has resource potential but assistance is necessary to encourage further exploration.

- (ii) the development of proven potential is economically feasible, but encouragement and assistance are necessary to bring about the actual exploitation of the resource.

Application

- Requests for assistance will be submitted to the Director, Northern Economic Development Branch, Department of Indian Affairs and Northern Development, 400 Laurier Avenue West, Ottawa 4.
- The filing of a request is the first step and indicates the interest and ability of the applicant to undertake the development if departmental funds are made available and outlines the work proposed by the applicant. It also provides information on which the department can base its evaluation of the project.
- Items of development proposed for inclusion in a request for assistance will be considered in the light of Department of Transport standards existing at the time. Each item or project for which assistance is sought will be justified on its own merit and must contribute towards the usefulness of the airport and safety of operations.

Advance Planning

- In cases where an eligible project cannot be completed in one fiscal year, allocations may be made for more than one fiscal year provided, however that any such future allocations cannot be accepted as a departmental commitment until Parliament has approved the necessary funds.

1-6.1 OTHER PROGRAMS AND INCENTIVES

The Federal Government will in some instances finance economic feasibility studies of proposed northern primary production operations. The Government also provides assistance and services such as financial support for Chambers of Mines, subsidized assay services, strategically located mining recorder's offices and the planning and development of certain townsites.

Federal Government departments and agencies work together in providing material assistance to various resource development operations. The Departments of Transport and Public Works may provide or assist in developing physical facilities necessary for the movement of materials in pre-production operations and the subsequent shipment of material in production operations. The Northern Canada Power Commission, a Crown agency may be involved in the provision of hydro-electric or thermally generated electric power to production operations, such as at Pine Point and Yellowknife.

These forms of financial aid and general assistance are over and above the various tax concessions, benefits and write-offs available to companies under the Income Tax Act.

The form and amount of assistance depends on the actual operation envisaged – in particular, its potential contribution to the objectives of northern development.

Inquiries for additional information on incentive programs may be obtained from the Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

1-7.1 – SMALL BUSINESS LOAN FUNDS

In a move to meet the special requirements of small business enterprises North of 60 the Federal Government has established Small Business Loan Funds, amounting to \$5,000,000 each for the Yukon and the Northwest Territories. Loans will be made available as soon as the administrative machinery is established. They will be administered by local credit committees in Whitehorse, YT, and Yellowknife, NWT.

Under the plan, up to \$300,000 will be lent annually in each Territory from the funds to businesses already operating or to entrepreneurs starting a new business.

The Government established the program because small business men North of 60 generally lacked access to sufficient capital or credit to finance the higher-than-average investments required for northern operations. Existing credit sources in the Territories, such as chartered banks, have been unable to meet the special needs of small businesses in the regions.

Such businesses as hotels, laundries and restaurants, municipal services and small manufacturing plants will be able to take advantage of the funds. The interest rate will be such that the scheme is self-sustaining except for administrative costs connected with the provision of management advice, which will be absorbed by the Federal Government.

Only residents of the two Territories are eligible for loans.

Further information may be obtained by writing:

Director,
Territorial Relations Branch,
Department of Indian Affairs and Northern Development,
400 Laurier Avenue W.,
Ottawa 4, Ontario.



northern economic
development branch
department of indian affairs
and northern development
government of canada

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OIL AND GAS NORTH OF 60

2-1.1. GENERAL

The world's oil and gas seekers today are converging on Canada North of 60 looking for what most experts now feel will be one of the biggest oil pools ever discovered. Encouraged by favorable geological conditions and by discoveries in neighboring areas of Alberta, British Columbia and the Prudhoe Bay region of the north Alaskan coast, the explorers are moving men and material into the western Arctic for the hunt.

How much oil and gas will be found is, of course, unknown. However, by comparing the estimated volume of sediments with those in other areas of more advanced stages of development some reasonable calculations can be made.

North of 60 about 450,000 square miles are underlain by sedimentary rocks, ranging in age from Cambrian to Tertiary that may be considered to be potentially productive of oil and gas. Excluding all sediments in areas where the total section is less than 1,000 feet thick, as well as those at depths exceeding 16,000 feet, — at present believed to be only marginally attractive — there are nearly 100,000 cubic miles of sedimentary rocks.

Applying a factor of 50,000 barrels of oil and 300,000,000 cubic feet of gas per cubic mile of sediment — the average established in the United States where many basins have been subject to rather complete exploration — possible reserves North of 60 may be 50 billion barrels of oil and 300 trillion cubic feet of gas.

A comparison of the sedimentary areas, volumes and proven oil and gas reserves in the Western Provinces, the Yukon, Northwest Territories and Arctic Islands indicates that from the standpoint of oil and gas, Canada North of 60 is virtually unexplored. Since 1947 — generally considered to be the beginning of the modern era for oil and gas exploration in Canada — there has been one exploratory well drilled on the mainland North of 60 for each 1,800 square miles of sedimentary area. In the Arctic Islands, the exploratory drilling density is one well for every 100,000 square miles. This contrasts with the Western Provinces where the density of exploratory drilling is one well for every 40 square miles. (See MAPS 2-1 and 2-2, Table 2-1.)

2-1.1.1 — Norman Wells

The existence of oil North of 60 has been known since 1789 when Alexander Mackenzie recorded the presence of oil seeps along the banks of the river that bears his name, near Norman Wells.

In 1890 other explorers recorded the discovery of oil seepages along the north shore of Great Slave Lake, and near Fort Good Hope, down-river from Fort Norman.

Encouraged by the results of a detailed study of the area, the Northwest Company, a subsidiary of Imperial Oil Limited, began drilling Discovery No. 1 in 1920. Oil was found in fractured shales at a depth of 783 feet and development drilling led to the discovery of oil in the underlying Kee Scarp reef, now the producing horizon at Norman Wells.

The field developed slowly until World War II created a great demand for petroleum products in northern Canada and Alaska. Many development wells were drilled in the early 1940's and the Canol crude oil pipeline, completed in 1944, linked the field to a refinery at Whitehorse. Gross production rose from 267,000 barrels in 1943 to 1,220,000 barrels in 1944. The pipeline operation was terminated the following year and since 1945, production has varied

2-1.1.1

from 1,500 to 2,000 barrels a day with 1968 production being at a daily rate of 1,874 barrels.

Norman Wells oils reservoir is a coralline limestone reef located between an upper and lower shale series of Devonian age. The porous portion of the reef rests on a basal reef limestone about 100 feet thick, which extends over a wide area beyond the productive limits of the pool. The structure is monoclinical and dips in a southwesterly direction at an angle of approximately four degrees. Closure of the oil saturated section is formed by a pinching out of the reef on the updip side. On the downdip side edgewater limits the productive outline.

The average gross thickness of the oil saturated reef is 244 feet with the thickest section encountered being 388 feet. The effective productive outline of the Norman Wells pool is 3,800 acres.

Information regarding porosity and permeability is limited. Cores were taken in several wells, but the entire section was cored and analysed from only one well (Mainland 37X). The weighted average porosity of the effective section in well 37X is 13.3 per cent and the average permeability to air is 10.5 millidarcys. The connate water saturation of the reservoir has not been determined but 25 per cent has been assigned for reserve estimates. The shrinkage 0.813. On the basis of this data the Norman Wells field is estimated to contain 419 million barrels of oil-in-place. The field has produced about 12 million barrels, and the Canadian Petroleum Association estimates 48 million barrels of additional recoverable oil.

Of the Norman Wells refinery products, middle distillates are in largest demand. This leaves a surplus in lighter and heavier distillates. The lighter products are re-injected, while the heavier residual is burned. Additives and alkylates for blending are brought to the local refinery from Edmonton, Alberta, to provide premium motor and aviation gasoline for markets along the Mackenzie River and Arctic Coast.

Forecasts made by Imperial Oil Limited indicate that demands for petroleum products from the Norman Wells refinery will increase. Their studies also show that the supply of crude from the field will begin to decrease under natural depletion in the near future. To sustain productivity and meet forecast requirements a downdip water injection scheme is being implemented and two additional producers were drilled in the summer of 1968. (See TABLES 2-2 to 2-4.)

2-1.1.2 – Panarctic Oils Ltd.

The great land masses of Canada's Arctic Islands have long been regarded as a potential "treasure house" of metallic, hydrocarbon and other minerals. A few years ago, the Canadian Government set up mineral rights exploration policies to encourage Arctic development. A host of companies took up oil and gas permits on some 65,000,000 acres and several million dollars were spent on surveys, and on the drilling of three costly exploratory wells.

Interest in the Arctic waned during the 1964-1967 period because of high costs and high risk factors, and because of attraction or risk capital to such areas as the North Sea oil and gas play, and the Western Canadian provinces. However, in October, 1967, several of Canada's leading oil and mining firms agreed to carry out a joint exploration program in the Arctic Islands and in December, 1967 the Canadian Government agreed to provide additional funds under its Northern Mineral Exploration Assistance Program. Panarctic Oils Ltd. was on its way and the long-discussed hunt for oil and minerals in the Arctic Islands reached a new stage.

Panarctic's initial financing involves \$20,050,000 of which Canada's Government will provide \$9,022,500 for a 45 per cent equity, and private capital will contribute

\$11,027,500 for a 55 per cent total equity. Involved are 2,000,000 Preferred Shares of \$10 par, being purchased for \$20,000,000 and 500,000 Common Shares issued at ten cents each. (See Table 2-5)

Government and corporations are participating in equity on the same terms. All original shareholders have comparable priority in providing additional capital, when and if required.

The Government, in addition, is owner of the mineral rights in the Arctic Islands, and will receive its normal fees and rentals on exploration rights, and royalties on production.

Panarctic has acquired over 44 million acres of oil and gas permits in the Arctic Islands and the initial \$20,000,000 will go into exploration over a three-year period. In addition to the extensive geological and geophysical surveys, the program involves some 17 wells, including nine deep tests, six wildcats of medium depth, and two shallow tests.

Panarctic's field exploration program commenced in 1968 when seismic and gravity surveys, as well as geological studies, were carried out in the Arctic Islands. Initial drilling began in the 1969 spring season on Melville Island.

The Arctic permits cover petroleum and natural gas rights only. However, exploration will be directed towards not only these hydrocarbon resources, but also sulphur, metallic minerals and other natural resources. Under the agreements, Panarctic management has 15 days' priority to stake claims on any mineral deposits located as a result of the Company's work. Only in the event of Panarctic deciding against staking of claims within that time limit, would individual shareholders of that company on their own behalf have the right to stake claims.

2-1.1.3 Beaver River – Pointed Mountain

The tri-corner area of the Yukon, Northwest Territories and British Columbia is an area of intense drilling activity and a high level of interest. This great interest has been generated by the discovery of two large gas fields and a proposed gas transmission line into the area.

Geologically, this area, known as the Liard Plateau, comprises numerous tight anticlinal structures bounded by broad synclines. The anticlines are complex and sinuous with steep east and west dipping faults on the flanks. The rocks represented are Cretaceous sands and shales underlain by Carboniferous sands which are underlain by Mississippian and Upper Devonian shales. Carbonates ranging in age from Middle Devonian to Ordovician form the main reservoir beds with the Carboniferous sands forming secondary objectives. Six wildcat wells have been drilled and gaseous hydrocarbons have been found in Middle Devonian Carbonates where they occur deeply buried in the core of these anticlines.

The Beaver River gas pool, on the Yukon, – British Columbia border and the Pointed Mountain gas pool in the adjacent part of the Northwest Territories were discovered in 1958 and 1966 respectively by Pan American Petroleum Corporation and in January, 1967, Pan American entered into a Gas Development Contract with Westcoast Transmission Company. The contract contains an agreement in respect to construction of a \$15 million, 20 inch pipeline from Westcoast's present terminus at Fort Nelson, B.C., to a point at the Beaver River gas pool in British Columbia one mile south of the Yukon border if sufficient gas reserves were proved up and if permission could be obtained to export the gas to the United States. The contract also

2-1.1.3

contains a gas purchase agreement to the effect that deliveries of gas from Pan American's reserves in the Beaver River - Pointed Mountain area will be made to the pipeline at a daily rate of 100 MMcf commencing November 1, 1969, and increasing to 205 MMcf/d commencing November 1, 1970. There is an option to purchase a further 200 MMcf/d by increments after 1970.

Westcoast has obtained the necessary export-import licences, and, in order to establish reserves, Pan American has started an active development drilling program in the Liard Plateau. The company has drilled three wells on the Beaver River gas pool in British Columbia and a fourth development well is now being drilled on the same structure in the Yukon. In addition two development wells were drilled at Pointed Mountain in the Northwest Territories.

The Beaver River and Pointed Mountain discoveries, along with a proposed pipeline into the area, have also triggered a new exploratory cycle. Pan American are now drilling a wildcat well 12 miles west of Pointed Mountain on what appears to be the north end of the complex structure which contains the Beaver River pool and a second wildcat is being drilled jointly by Pan American and Shell 20 miles Northwest of the Beaver River pool.

2-2.1 EXPLORATION COSTS NORTH OF 60

Oil and gas exploration costs North of 60 vary by location. In general, they are higher than in the settled regions of Canada. (See FIG. 2-1 to 2-4).

Following are average costs of oil and gas exploration in 1968:

2-2.1.1 Latitude 60° – 65°

Surface Geologic Surveys	\$70,000 – \$75,000 per month for – a 2 geologic party group (4 geologists) – camp costs – helicopter charter – air support
Gravity Meter Surveys	– \$2,500 – \$4,000 per month if 2 men party attached to seismic crew. – \$30 – 40,000 per month if separate, the additional costs include bulldozing or helicopter charter
Aeromagnetometer Surveys (includes processing)	– \$20 per linear mile – gradiometer type – \$10 per linear mile – high sensitivity type – \$ 3 per linear mile – flux-gate type
Seismic (Reflection only) (Does not include mobilization costs)	– \$60 – \$75,000 per month plus bulldozing costs. (Bulldozing costs vary from \$15 – \$40,000 per month) Normal production is 40 – 50 miles per month – \$3,000 per linear mile may be a reasonable turn-key contract price.
Drilling	– Of the 27 wells drilled south of latitude 65° in 1967 average drilling costs varied from \$17 – \$123 per foot. By eliminating the low and high figure the median averaged out to \$46 per foot. The costs include: * move-in and move-out * tangible and intangible costs * preparing well-site * constructing roads * stand-by time if applicable.
Roads	– Seismic trails can be cleared for \$500 – \$1,000 per mile. Roads suitable for moving rigs can be built for \$1,000 – \$4,000 per mile. (Depending on number of ice bridges to be built)

2-2.1.2 Latitude 65° – 70°

Surface Geologic Surveys	\$80,000 per month for – a 2 geologic party group (4 geologists) – camp costs – helicopter charter – air support
--------------------------	--

2-2.1.2

Gravity Meter Surveys

- \$3,000 – \$5,000 per month if 2 men party attached to seismic or surface party.
- \$35 – \$50,000 per month if party operates on their own logistics. This includes bulldozing or helicopter rental.

Aeromagnetometer Surveys (includes processing)

- \$20 per linear mile — gradiometer survey
- \$15 per linear mile — high sensitivity type
- \$ 5 per linear mile — flux-gate aeromagnetometer

Seismic (Reflection only)

- \$130,000 per crew month includes bulldozing but not mobilization costs.
- \$200,000 per crew month for short programs which includes bulldozing, mobilization costs and air support.
(Normal production about 50-60 miles per crew month)

Drilling

- Of the 9 wells drilled north of latitude 65° in 1967 average drilling costs varied from \$32 to \$236 per foot. By eliminating the lowest and the highest figure, median averages \$102 per foot.
The costs include
 - *move-in and move-out
 - *tangible and intangible costs
 - *constructing roads
 - *preparing well-site
 - *water transportation
 - *stand-by time when applicable

Roads

- Seismic trails can be cleared for \$500 per mile.
Roads suitable for moving rigs can be built for \$1,000 – \$4,000 per mile. (Depending on number of ice bridges to be built and logistics)

2-3.1 SEDIMENTARY GEOLOGICAL PROVINCES

Canada North of 60 can be divided into seven major sedimentary areas:
(See Map 2-3).

1. Interior Plains
2. Mackenzie Mountain Area
3. North Yukon Area
4. Arctic Lowlands
5. Franklinian Geosyncline
6. Sverdrup Basin
7. Arctic Coastal Plain

2-3.1.1 Interior Plains

This area is part of the large geologic province which covers mainland Canada between the Precambrian Shield and the Cordillera and extends southward into the United States. In the Northwest Territories mainland, this sedimentary area is underlain mainly by horizontal or gently dipping Lower Paleozoic, Devonian, Carboniferous and Cretaceous sediments that thicken southward into northern Alberta and westward into the Cordilleran Geosyncline. Regional unconformities lie at the base of the Paleozoic, Middle Devonian and late Lower Cretaceous.

On the basis of structure and stratigraphy, the Interior Plains North of 60 can be subdivided into three regions, From south to north, these are the Great Slave Plain, the Great Bear Plain and the Anderson Plain-Peel Plain-Peel Plateau region.

Geologically, the Great Slave Plain is the northern extension of areas that are producing oil and gas in the northern parts of Alberta and British Columbia; most of the exploratory drilling North of 60 has been in this area. Small gas discoveries have been made at Rabbit Lake, Netla, Celibeta, Island River, Trainor Lake, Bovie Lake and Cameron Hills.

As a result of this drilling, the general geology is known. Strong topographic relief characterizes the surface of the Precambrian crystalline basement. These irregularities are partly infilled by porous Cambro-Ordovician sandstones. Overlying this is a sequence of Middle Devonian carbonates part of which is biogenic in origin and gives way laterally to evaporites. The gas discoveries have been in these carbonates which are an extension of the gas reservoir belt of northeastern British Columbia. The section above the Middle Devonian comprises shales with a few carbonate interbeds.

The Great Bear Plain is a west-dipping homocline of Ordovician, Silurian and Middle Devonian carbonate extensively exposed or overlain by a thin veneer of Cretaceous shale. North-trending uplifts which merge with the Franklin Mountains bring Ordovician, Silurian and Middle Devonian rocks to the surface.

The Anderson Plain is underlain by a west-dipping homocline that extends into the basin beneath the Peel Plain and Peel Plateau. The Cambrian rocks are predominantly shallow water, marine beds deposited under conditions of arid climate and restrictive circulation. They grade from porous sands and red beds in the east to red beds and salt in the central area to varicolored shale, gypsum and limestone in the west. The Ordovician and Silurian are a thick, partly porous dolomite which undergoes a facies change to shale on the west side of the Peel Plateau. Overlying this is a middle Devonian carbonate which passes eastward into evaporites and breccias and westward into shale and is in turn overlain by a cover of shale with some sandstone ranging in age from Upper Devonian to Upper Cretaceous.

2-3.1.2

2-3.1.2 Mackenzie Mountain Area

The Mackenzie Mountain Area embraces the Mackenzie and Franklin Mountains as well as two potential petroleum provinces, the Liard Plateau and the Mackenzie Plain. In the Liard Plateau, the valleys are synclines while the hills are complex folded and faulted anticlinal features with several doubly-plunging linked culminations. Deformation is considered to be Laramide.

Large quantities of gas have been found in a thick sequence of Middle Devonian carbonates where it occurs buried in the culminations of such structures at Beaver River and at Pointed Mountain under a cover of Upper Devonian and Carboniferous shales and sandstones.

Much of the Mackenzie Plain is characterized by extensive linear synclines and broad gentle anticlines, commonly linked en echelon and broken by faults of small displacement.

Porosity is known to be present in several horizons in the Mackenzie Plain. The Ordovician and Silurian beds are a thick, partly porous dolomite and the Middle Devonian breccias also carry porosity although some anhydrite plugging is known. The Upper Devonian Kee Scarp limestone and reefs underlie the northern part of the Mackenzie Plain and are the reservoir rock at the Norman Wells oilfield. Such reefs occur at the top of an extensive platform of bedded limestone and may reach several hundred feet in thickness.

2-3.1.3 Northern Yukon Area

The Northern Yukon Area includes a complex of varied structural trends surrounding the Old Crow Plain, Eagle Plain, and Arctic Plateau.

The Old Crow Plain has a cover of Quaternary and Tertiary sediments and little is known of the underlying section. The area is flanked on the south by metasediments and granites and on the other sides by Devonian carbonate and Jurassic and Lower Cretaceous clastics.

Most of the Arctic Plateau beneath the cover Jurassic and Cretaceous shales and sandstones may be floored by low-grade metamorphic rocks. Mississippian limestones and Triassic sandstone intervene in the southwest and Permian, Carboniferous and possibly Devonian clastics occur in the northeast.

The Eagle Plain is a rectangular structural basin framed by areas of complex structure. These are the Richardson Mountains to the east, the Dave Lord Ridge to the north, and the Ogilvie Mountains to the west and south. Around the periphery of the basin the structures trend parallel to the adjacent areas while in the central area, they comprise north-trending, broad, open folds.

Sixteen wells including five completion have been drilled in the Eagle Plain and the stratigraphy, based on data from these as well as the adjacent mountains, is well known. Overlying Cambrian siltstones and sandstones is a series of carbonates ranging in age from Ordovician to Middle Devonian that change facies to shale. This series is overlain by a thick sequence of Upper Devonian to Cretaceous shales and sandstones.

The five wells that were completed encountered hydrocarbons in the Permo-Carboniferous part of this sequence. One of these wells, the Western Minerals Chance No. 1 oil and gas well, was the first successful test drilled in the Yukon.

2-3.1.4 Arctic Lowlands

The Arctic Lowlands are divided by salients and inliers of Precambrian rocks into six basins: Victoria Strait Basin, Jones — Lancaster Basin, Melville Basin, Wollaston Basin, Foxe Basin, and the Banks Basin.

Porous Cambrian sandstones are present in some areas but the principal rocks of the Lowlands are limestones and dolomites that range in age from Middle Ordovician to Lower Devonian. Of these, the Cornwallis and Allen Bay dolomites are characterized by reefoid developments, vuggy porosity and bituminous residues. They are widely exposed in southerly regions of the Lowlands but are covered by Silurian to Lower Devonian limestones in the north and by beds as young as Tertiary in the west.

In the Melville Basin the Silurian is overlain by limestones and bituminous shales of the Middle Devonian Blue Fiord Formation. Thick Middle to Upper Devonian shales and sandstones constitute a cover. Isolated Upper Devonian reefs also occur and the trend may extend westward beneath the Cretaceous and Tertiary clastics of the Banks basin.

2-3.1.5 Franklinian Geosyncline

The Franklinian Geosyncline embraces miogeosynclinal rocks included in the Parry Islands, Cornwallis and Central Ellesmere Fold Belts, and rocks of eugeosynclinal character included in the Northern Ellesmere Fold Belt.

The Cornwallis Fold Belt is characterized by north-trending closely-folded anticlines separated by broad shallow synclines. Dome-like structures occur in the narrow margin where the north-trending folds are in conjunction with the east-trending folds of the Parry Islands Fold Belt.

Two wells have tested structures within this belt. Lobitos et al Cornwallis Resolute Bay L-41 was abandoned in December 1963 at 4840 feet after encountering porous, water-saturated carbonates in the Ordovician Cornwallis Formation.

Dominion Explorers — Canso et al Bathurst Caledonian R. J-34, which drilled on a dome-like structure on the western edge of the Cornwallis Fold Belt was abandoned in February 1964 at 10,000 feet. The well spudded in the Silurian and drilled 6700 feet of interbedded shales and carbonates followed by 3300 feet of an evaporitic sequence containing anhydrite, some salt, shale and dolomite.

Structures of the Parry Islands Fold Belt are long, sublinear, symmetric, gently-plunging east-trending folds which gradually decrease in amplitude southward toward the Arctic Lowlands. Dome et al Winter Harbour No. 1, the first well drilled in the Arctic Islands, tested such a structure. The well encountered small pockets of gas and was abandoned at 12,543 feet in March, 1962.

The Central Ellesmere Fold Belt embraces a region of northeasterly trending folds and thrusts produced by Variscan and Laramide orogenies. In the southerly regions Variscan structures are broad open folds and Laramide tectonism appear to have been moderate. Both Variscan and Laramide structures are more intense in the north.

The Northern Ellesmere Fold Belt includes metamorphosed Precambrian eugeosynclinal rocks as well as acidic and basic intrusions.

2-3.1.5

Within the Franklinian geosyncline, a thick sedimentary sequence ranging in age from Ordovician to Devonian is present. The Ordovician, Silurian and Lower Devonian carbonates that underlie the Arctic Lowlands thicken northward into the geosyncline and grade into graptolitic shale.

The Ordovician Cornwallis Formation is very thick and extensive on Ellesmere Island and isolated outcrops occur within the Parry Island Fold Belt. The upper part contains recfroid dolomites on Cornwallis and Bathurst Islands but is dense on Melville Island where it grades into shale.

The Upper Ordovician-Silurian Allen Bay Formation includes several zones of coarsely crystalline porous dolomite. The overlying Read Bay Formation is mainly dense but the upper part includes biogenic, reefoid, and porous limestones. The facies change between these formations and the Cape Phillips shale is generally abrupt with several thousand feet of carbonate passing into shale within a few miles but on Cornwallis Island tongues of porous dolomite up to 100 feet thick extend 30 or 40 miles beyond the front.

On Ellesmere Island a carbonate bank occurs surrounded entirely by Cape Phillips clastics and similar banks are also known on Melville Island,

Potential Lower Devonian reservoirs are limestone and small bioherms of the upper Read Bay Formation and Sherard Osborn Formation. The Middle Devonian comprises mainly bedded carbonates with local biogenic and reefoid beds. The Lower and Middle Devonian carbonates also pass into shale.

The youngest rocks known in the Franklinian Geosyncline are late Middle Devonian shales and dense siltstones and Upper Devonian sandstone and shale, mainly non-marine in origin.

2-3.1.6 Sverdrup Basin

The Sverdrup Basin contains a thick sequence of late Paleozoic to early Tertiary strata that lie with profound unconformity on deformed older Paeozoic beds. The section may be as much as 40,000 feet thick.

Laramide folding and thrusting affected much of the Sverdrup Basin being most intense in the northeast part. West of the Ringnes Islands deformation is less intense, dips are generally less than five degrees, and the structure is a northeast plunging synclinorium with gentle folds radiating from the axis.

The Laramide strike is closely related to older Paleozoic deformations. On west-central Ellesmere Island Laramide structures parallel the Variscan trend and folds on much of the Axel Heiberg Island are aligned with those of the Caledonian and Variscan. These older belts appear to have produced differential rates of subsidence during the Mesozoic.

In the axial part of the basin there are at least two units of anhydrite, one of Carboniferous age and the other Permian. The evaporites intruded the overlying Mesozoic and Tertiary beds as domes, in diapiric folds, and along faults. Available evidence suggests that the lower evaporite is the principal source. No halite has been found either in the intrusives or where the evaporites are known in situ.

In eastern Sverdrup Basin, where the Triassic forms the exposed core of many folds, Pennsylvanian and Permian rocks constitute the potential reservoirs. The thick

succession on Ellesmere Island includes limestone banks, locally reefoid and isolated reef masses capped by black shale. The limestones grade westward into a thin shale and siltstone sequence constituting the axial part of the basin and eastward to marginal facies of sandstone and conglomerate.

Mesozoic sedimentation is characterized by basinal marine shales and siltstone with partly porous marine sandstone intertonguing from the east and south margins and at some horizons from the northwest also. Tar sands are present in the basal part of the Triassic Bjoine Formation on Melville Island.

Gabbro sills and dykes intrude formations as young as Upper Cretaceous in the eastern part of the Sverdrup basin. Individual sills attain a thickness of 300 feet and adjacent strata may be metamorphosed to a distance of about 80 feet. The presence of numerous basic intrusives may not be entirely an adverse feature as they could produce effective traps on the flanks of folds.

2-3.1.7 Arctic Coastal Plain

This broad geologic province covers the northwestern part of North America and much of it lies beneath the Beaufort Sea. The Canadian land portion includes parts of Banks and Prince Patrick Island and the northern parts of the outer Canadian Arctic Islands as well as a 10 to 20 mile wide strip of gently rolling terrain on the western part of the north coast, north of the Interior Plains and North Yukon Areas. The Arctic Coastal Plain is through-going into Alaska where the land portion widens to 150 miles because of the divergence between the mountainous chain which marks the southern boundary of the area and the seacoast.

Bedrock in the Arctic Coastal Plain is late Tertiary or Pleistocene non-marine sands and gravels. From drilling in the Mackenzie Delta and Alaska it is known that beneath the cover lie non-marine Cretaceous beds which are underlain, in turn, by marine clastics of the Cretaceous, Jurassic and Triassic. An unconformity separates these rocks from the shales and limestones of the Carboniferous Lisburne Formation. Middle and Lower Paleozoic rocks are exposed in the mountainous areas south of the Arctic coastal Plain but it is doubtful that these extend very far north. The Carboniferous and Triassic are oil and gas reservoirs at the major discovery at Prudhoe Bay in Alaska.

The alluvium cover masks the structural geology of much of the area. In Alaska, long north-northwest trending anticlinal structures of Laramide origin have been mapped. The Prudhoe Bay discovery is on one of these.

Submarine scarps, also with a north-northwest alignment have been mapped in the Mackenzie Bay area and normal faults of small displacement occur on Prince Patrick Island.

The early history of the Mackenzie Delta is unknown. Fault scarps are present on the east and west sides suggesting that it may have been a graben for at least a part of its history. The B.A. Shell IOE Reindeer D-27 well bottomed in sediments believed to be Jurassic at 12,668 feet proving the presence of a thick Cenozoic-Mesozoic sequence, regardless of origin. Some good shows of oil were encountered in samples and a small amount of gas was recovered on drillstem test.

2-4.1 – GOVERNMENT SERVICES AND REQUIREMENTS

All aspects of oil and gas operations in the Yukon and the Northwest Territories are administered by the Oil and Gas Section, Oil and Minerals Division, Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

It is the intent of the Department to provide a regulatory climate that will best encourage and provide for the orderly exploration and exploitation of oil and gas North of 60.

2-4.1.1 Oil and Gas Regulations

Regulations in effect for oil and gas administration are made pursuant to the Territorial Lands Act, and Public Lands Grants Act.

They include:

- * Canada Oil and Gas Land Regulations
- * Oil and Gas Land Order No. 1 – 1961
- * Oil and Gas Land Order No. 2 – 1961
- * Oil and Gas Land Order No. 1 – 1962
- * Oil and Gas Land Order No. 2 – 1962 (amended)
- * Canada Oil and Gas Drilling and Production Regulations

2-4.1.2 The Canada Oil and Gas Land Regulations

These regulations came into effect June 6, 1961. The Regulations provided for an applicant to select a grid area from a master map held in the Oil and Minerals Division showing all grid areas already under permit and those still available. An applicant may apply for any grid area which is available for filing and be granted a permit entitling him to explore for oil and gas (See Maps 2-4 to 2-6, Fig. 2-5).

The applicant shall pay a fee of \$250.00 per permit and deposit money, bonds, or a promissory note to guarantee that exploratory work required during the life of the permit is \$2.90 per acre on the mainland, \$2.65 per acre for the Arctic Islands and \$2.70 for water permits. The work expenditure requirement commences at five cents per acre and escalates to 50 cents per acre during the term of the permit.

If the permittee considers it necessary to evaluate adjacent areas as well as his own permits, he may be permitted to carry out this exploration regardless of whether the areas are open or have been allotted to another permittee. The deposits, which are required to ensure work, are returned upon satisfactory performance.

Permits on the mainland are valid for three, four or six years depending on location with six renewals of one year each. Marine permits under seacoast waters are valid for six years with six renewals of one year each; north of latitude 70° all permits issued prior to 1968 are valid for eight years with six renewal terms. Permits issued in 1968 and later are valid for six years with six renewal periods.

A permittee may acquire leases comprising in aggregate, not more than 50 per cent of the sections in each grid or half-grid for which he has a permit. The minimum size for leases is one section, and the maximum sizes are five sections by three sections or four sections by four sections. Leases are valid for 21 years and are renewable. The rental is 50 cents per acre for

the first year, and in the second and subsequent years is \$1.00 per acre. Up to 50 per cent of the annual rental can be in the form of unallocated work expenditures carried forward from the permit stage, and these surpluses may be credited against the rental until the expiration of the lease or until the start of commercial oil or gas production.

The 50 per cent of the permit not acquired under lease by the permittee returns to the Crown.

On October 12, 1961, two Oil and Gas Land Orders were issued granting the permittee an option to acquire the Crown's portion on the payment of an additional royalty which varies with location and production rates (See map 2-7).

If the option is not exercised, the lands returned to the Crown may be sold by tender as oil and gas leases by one of three methods: — cash bonus, work bonus or cash bonus plus and undertaking to drill a well to a specified depth.

On September 17, 1962, a third land order was issued setting out methods for disposal by permit of lands returned to the Crown. The methods to be used are sale by tender of single permits or blocks of permits for a work bonus or a cash bonus.

On December 22, 1964, Oil and Gas Land Order No. 2 — 1961 was amended to provide for lessees to deposit with the Chief, money, bonds, or an approved note of a value equal to the amount that the lessee undertakes to expend for exploration work on the lease area within one or more fixed periods. (See Figs. 2-6 to 2-9)

Safety inspections of all oil well drilling rigs is carried out by the Inspection Services Unit of the Department of Indian Affairs and Northern Development.

2-4.1.3 Exploration Requirements and Federal Services

Following are the requirements of the various federal agencies involved and the services that are available through these agencies for those companies engaged in oil and gas exploration activities North of 60:

2-4.1.4 Department of Indian Affairs and Northern Development

Pursuant to Section 52 of the Canada Oil and Gas Land Regulations notice of commencement of exploratory work must be filed 15 days prior to commencement of proposed programs on the mainland and Arctic Islands, and 45 days prior to commencement of exploratory work on offshore areas.

Notice is filed with:

Oil Conservation Engineer,
Oil and Mineral Division
Department of Indian Affairs
and Northern Development,
3303 — 33rd St. N.W.,
Calgary, Alberta Phone 403 — 284-2201

For information concerning wildlife sanctuaries and related matters:

Executive Director,
Canadian Wildlife Service,
Department of Indian Affairs and

Northern Development,
Ottawa, Ontario. Phone 613 - 992-3229

2-4.1.5 Department of Fisheries

Resource Development Service

Ninety days' notice in advance is required before the start of marine seismic surveys, in case a qualified observer may be required. Notification should be sent to the Regional Director with a copy to:

Director,
Resource Development Service,
Department of Fisheries,
Ottawa, Ontario. Phone 613 - 997-4044

Information regarding the Department's requirements can also be obtained from:

Assistant Director,
Resource Development Service. Phone 613 - 997-4526

Regional Director responsible for all fresh water lakes in the Yukon and the Northwest Territories:

R.N. Gordon,
114 Garry Street,
Winnipeg 1, Manitoba. Phone 204 - 946-8101

2-4.1.6 Department of Transport

The Aids to Navigation Division administers the Navigable Waters Protection Act. Parts I & II, and as such requires at least two months notice in advance of commencing work on offshore areas. Communications should be directed to:

Chief,
Aids to Navigation Division,
Department of Transport,
Ottawa, Ontario Phone 613 - 992-2736

The Meteorological Branch compiles data regarding weather and ice conditions, including information obtained from orbitting satellites. This data is available to exploration companies through:

Liaison Meteorologist,
Department of Transport,
No. 3 Temporary Building,
Ottawa, Ontario. Phone 613 - 992-4217

Information on Arctic Weather stations can also be acquired from:

Meteorological Branch,
Department of Transport,
Mackenzie King Building,
Toronto, Ontario. Phone 416 - 369-4932

2-4.1.6

Requirements and services of the Radio Regulation Division are available through:

Controller,
Radio Regulations Division,
Department of Transport,
Ottawa, Ontario. Phone 613 - 992-0840

or through:

Superintendent of Radio Authorization, and Enforcement,
Radio Regulations Division. Phone 613 - 992-3427

2-4.1.7 Department of National Revenue, Customs and Excise Division

All communications with respect to this agency should be addressed to:

Director,
Customs and Excise Division,
Port Administration Branch,
Department of National Revenue,
Ottawa, Ontario. Phone 613 - 992-2742

Attention: Commercial Operations Section

2-4.1.8 Department of Manpower and Immigration

Enquiries should be directed to:

Department of Manpower and Immigration,
Canada Immigration Division,
Admission Section,
Ottawa, Ontario. Phone 613 - 992-3305

The Calgary office of the Department of Immigration can answer any queries regarding entry into the Northwest Territories. The Vancouver office is responsible for entry into the Yukon Territory. At Tuktoyaktuk, NWT, a local Royal Canadian Mounted Police officer is also a representative of the Department of Manpower and Immigration and can clear entry into Canada via Tuktoyaktuk.

At Inuvik, NWT, the Customs Department has a Department representative and he can be contacted by telephone if prior arrangements are necessary.

2-4.1.9 Department of National Defence

Notification of off-shore operations in the Pacific or Western Arctic should be filed with:

The Flag Officer,
Maritime Commander (Pacific),
Victoria, British Columbia.

General enquiries can be directed to:

Chief of Defence Staff.

Phone 613 - 992-4248
Attention: Directorate of Operations, Ottawa, Ontario.

2-5.1 PUBLICATION SOURCES

Information on technical detail, maps, exploration and development work on oil and gas North of 60 is available from a number of sources in Ottawa and elsewhere. Following is a list of materials and their sources.

7.1.1 Schedule of Wells

The following publications are available from the Queen's Printer, Ottawa, or from any Government bookstore, and from the Oil Conservation Engineer, Department of Indian Affairs and Northern Development, 3303 – 33rd St. N.W., Calgary, Alta. Pre-payment is requested for all publications for which there is a charge, cheques or money orders are to be made payable to the Receiver General of Canada.

a) Schedule of Wells, 1920 – 1960	\$3.00
b) Schedule of Wells, 1920 – 1961	4.00
c) Schedule of Wells, 1920 – 1963	4.00
d) Schedule of Wells, 1962 – 1964	2.00
e) Schedule of Wells, 1965	3.00
f) Schedule of Wells, 1966	3.00
g) Schedule of Wells, 1967	2.50
h) Economics of Oil and Gas Development in Northern Canada	2.50
i) Statistical Report	2.50

2-5.1.2 Legislation – Acts and Regulations

The following may be obtained from the Chief, Oil and Mineral Division, and the Oil Conservation Engineer, Calgary:

- a) Canada Oil and Gas Land Regulations
- b) Canada Oil and Gas Drilling and Production Regulations
- c) Land Order No. 1 – 1961, as amended
- d) Land Order No. 2 – 1961, as amended
- e) Territorial Lands Act
- f) Public Lands Grants Act
- g) Land Order No. 1 – 1962, as amended
- h) Consolidation: Canada Oil and Gas Land Regulations as amended, Oil and Gas Land Orders as amended, Territorial Lands Act and Public Lands Grants Act as amended.

2-5.1.3 Miscellaneous

- a) Monthly Oil and Gas Bulletin
- b) List of Geological Reports and Well History Reports released from confidential status.
- c) Oil and Gas in the Yukon Territory and Northwest Territories,

2-5.1.4 Oil and Gas Permit Maps

The following maps are available from:

Chief, Oil and Mineral Division,
Northern Economic Development Branch,

2-5.1.4

Department of Indian Affairs and Northern Development
400 Laurier Avenue West,
Ottawa, Ontario.

and

Oil Conservation Engineer,
Department of Indian Affairs and Northern Development,
3303 - 33rd St. N.W.,
Calgary, Alberta.

Permit maps are revised to date of mailing and include indices of permittees:

	MAINLAND	SCALE	PRICE
No. 1	Main Sheet	1 inch = 25 miles	\$3.00
2	Southeast Sheet (Oil and Gas Leases shown on this sheet)	1 inch = 12 miles	2.00
3	Northeast Sheet	1 inch = 12 miles	2.00
4	East Sheet (Hudson's Bay)	1 inch = 12 miles	2.00
ARCTIC ISLANDS			
50	Main Sheet	1 inch = 27 miles	3.00

Lease Plates

Oil and Gas Lease Plats (1 grid area to a plat)	1 inch = 1 mile	.25 ea.
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Roads and Trails

Roads, Winter Trails and Seismic Lines

N.T.S.	— 85 SE-SW (1 sheet) Providence-Great Slave
	— 85 North — Rae
	— 95 North — Wrigley
	— 96 South — Norman
	— 105 North — Pelly River
	— 105 South — Whitehorse-Teslin-Wolfe Lake-Watson Lake
	— 106 South — Wernecke Mountains
	— 106 North — Arctic Red River
	— 107 South — Port Brabant
	— 115 North — Fort Selkirk
	— 116 South — Klondike
	— 116 North — Porcupine River

All on a scale 1 inch	250,000
85 C, D	— Kakisa River—Tathlina Lake 1: = 250,000
95 A, B	— Fort Liard—Trout Lake 1 inch = 4 miles

Prices: — \$0.50 per map — \$7.50 per set of 15 maps.

2-5.1.5 Brochures

The following brochures, although out of print, are available for reference purposes in the Library of the Department of Indian Affairs and Northern Development and at some other libraries in Canada:

- Guide to Northern Non-Renewable Resources
- Communication and Transportation Facilities, Queen Elizabeth Group
— Arctic Islands
- Resource Management Division — Responsibilities and Administration
- Oil and Gas Canada Lands — Volume No. 2 and No. 3.

Technical reports are available for reference use at the office of the Oil Conservation Engineer, Calgary, Alberta

“Technical Reports Available for Inspection 1968” (These are geological and geophysical reports on Canada Lands submitted by oil operators)

2-5.1.6 Additional Sources

In addition to the Department of Indian Affairs and Northern Development the following sources of information are available:

All cores and samples from wells drilled on Canada Lands are stored at the Institute of Petroleum and Sedimentary Geology, 3303 — 33rd Street, NW, Calgary Alberta.

Specialized and technical literature pertaining to Northern Canada can be examined or purchased at these government agencies:

a. Northern Co-ordination and Research Centre, or, Library, Department of Indian Affairs and Northern Development, 400 Laurier Ave. West, Ottawa, Ontario

b. Department of Energy, Mines & Resources

i) Geological Survey of Canada	Ottawa Ont. Vancouver, B.C.
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Institute of Petroleum and Sedimentary Geology	Calgary, Alta.
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ii) Dominion Observatories Branch	Ottawa, Ontario
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iii) Marine Sciences Branch	Ottawa, Ontario
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iv) Bedford Oceanographic Institute	Dartmouth, N.S.
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v) Surveys and Mapping Branch	Ottawa, Ontario
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c. Defence Research Board — Ottawa, Ont.
Scientific Information Service

d. Department of Transport

i) Marine Works Branch	Ottawa, Ont.
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ii) Marine Operations Branch	Ottawa, Ont.
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iii) Telecommunications and Electronics Branch	Edmonton, Alta.
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iv) Civil Aviation Branch	Ottawa, Ont.
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v) Meterological Branch	Winnipeg, Man.
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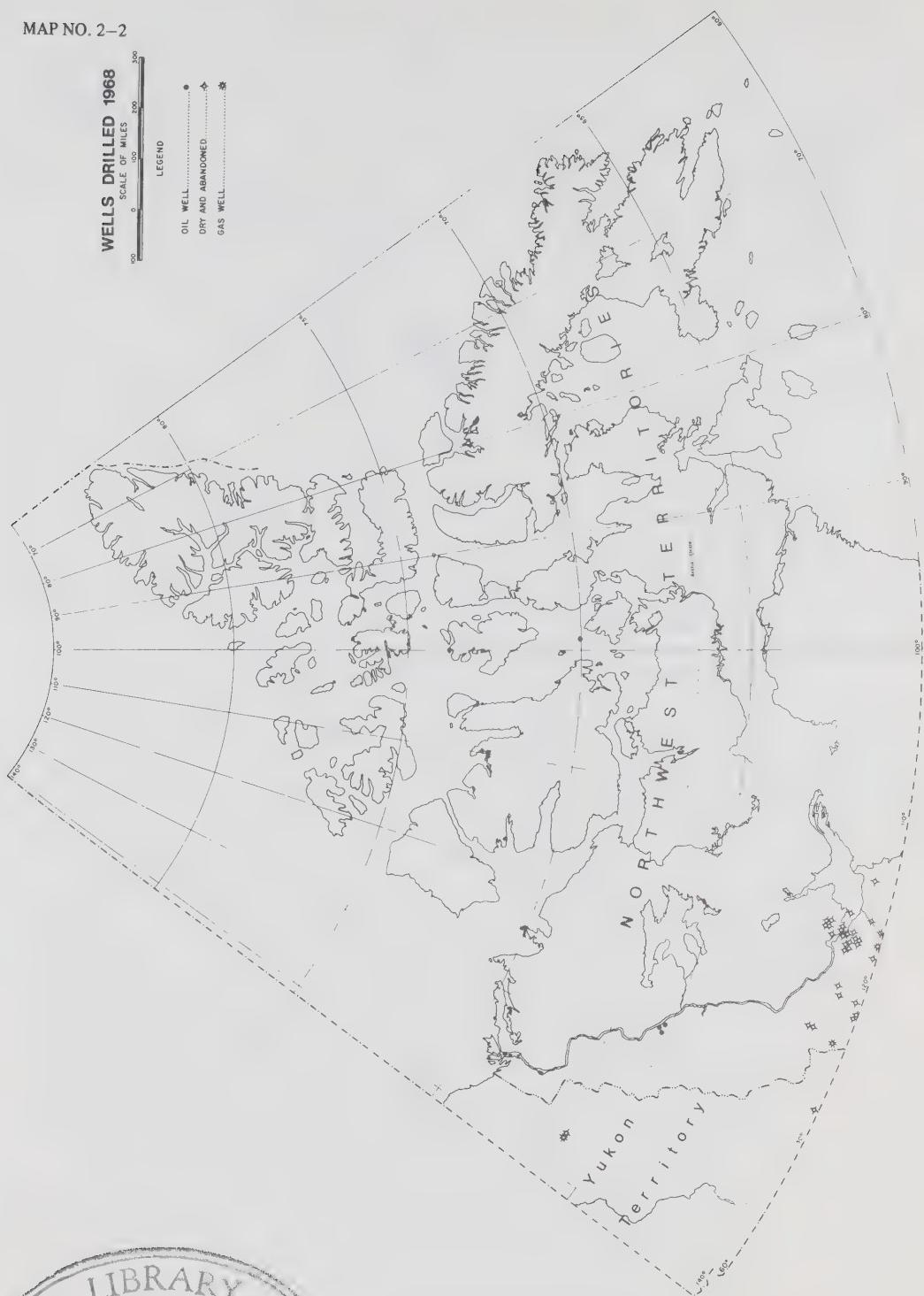
e. Arctic Institute of North America — Montreal, P.Q.

f. National Research Council — Ottawa, Ont.

MAP NO. 2-1



MAP NO. 2-2



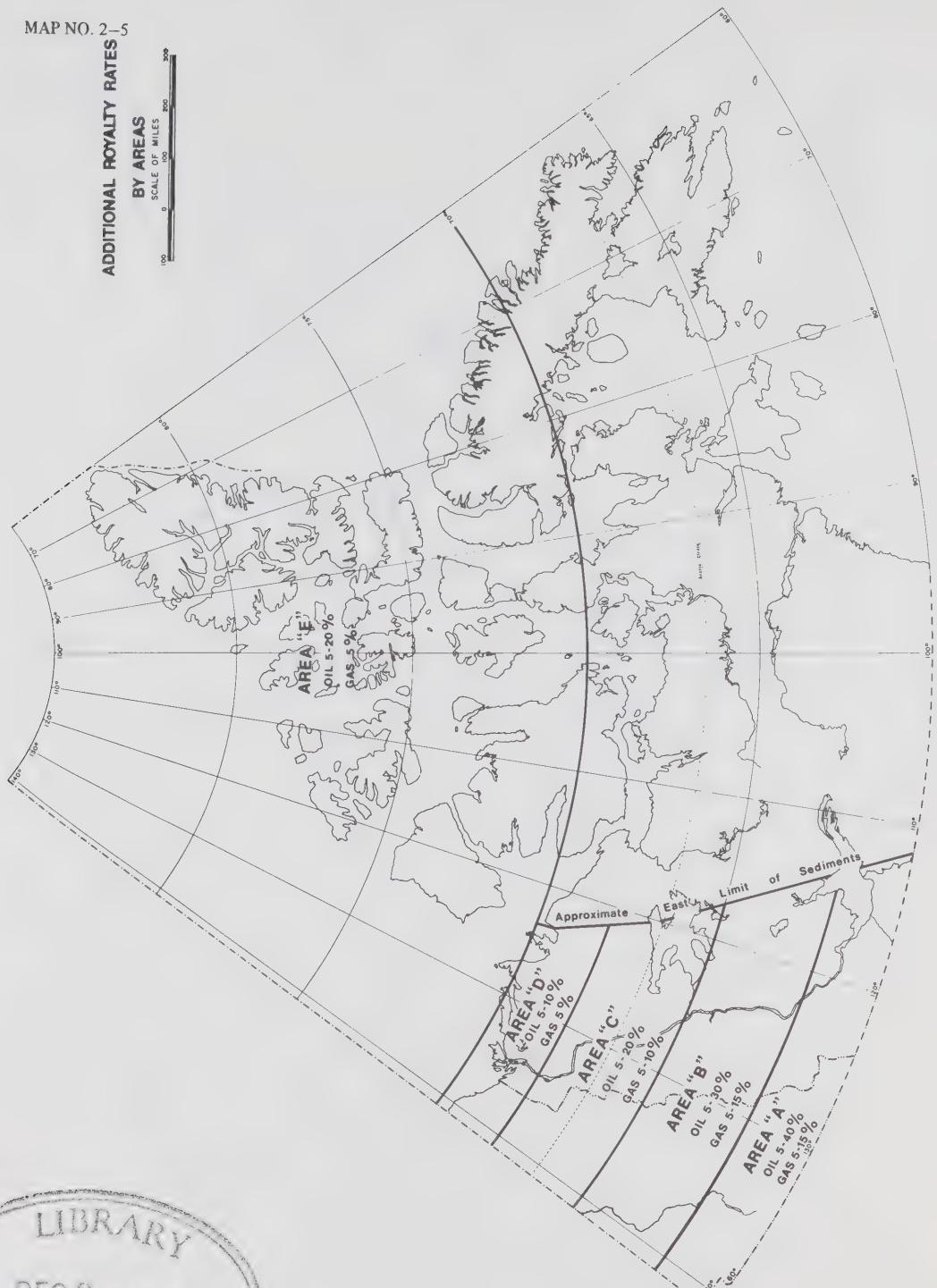




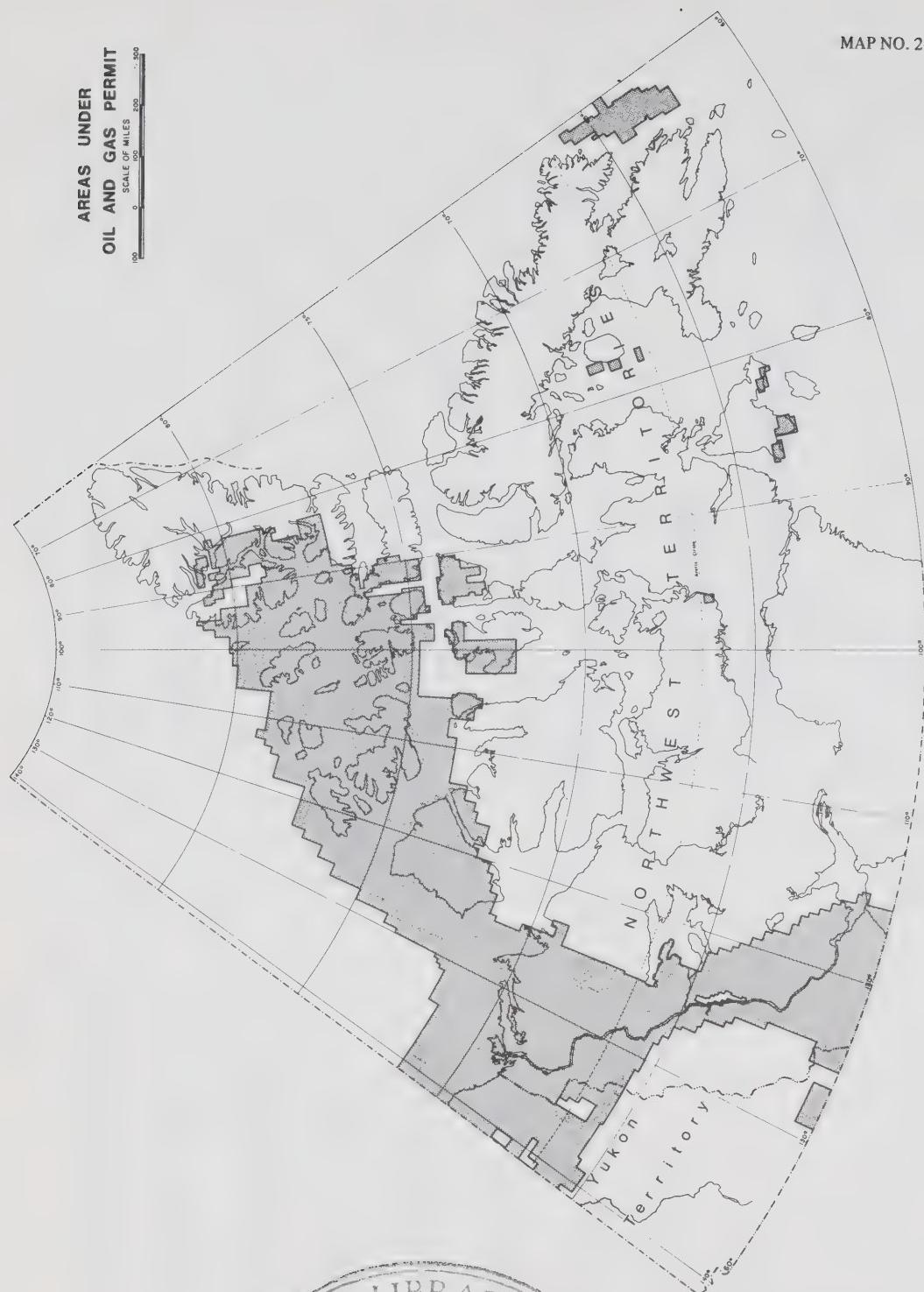
MAP NO. 2-4



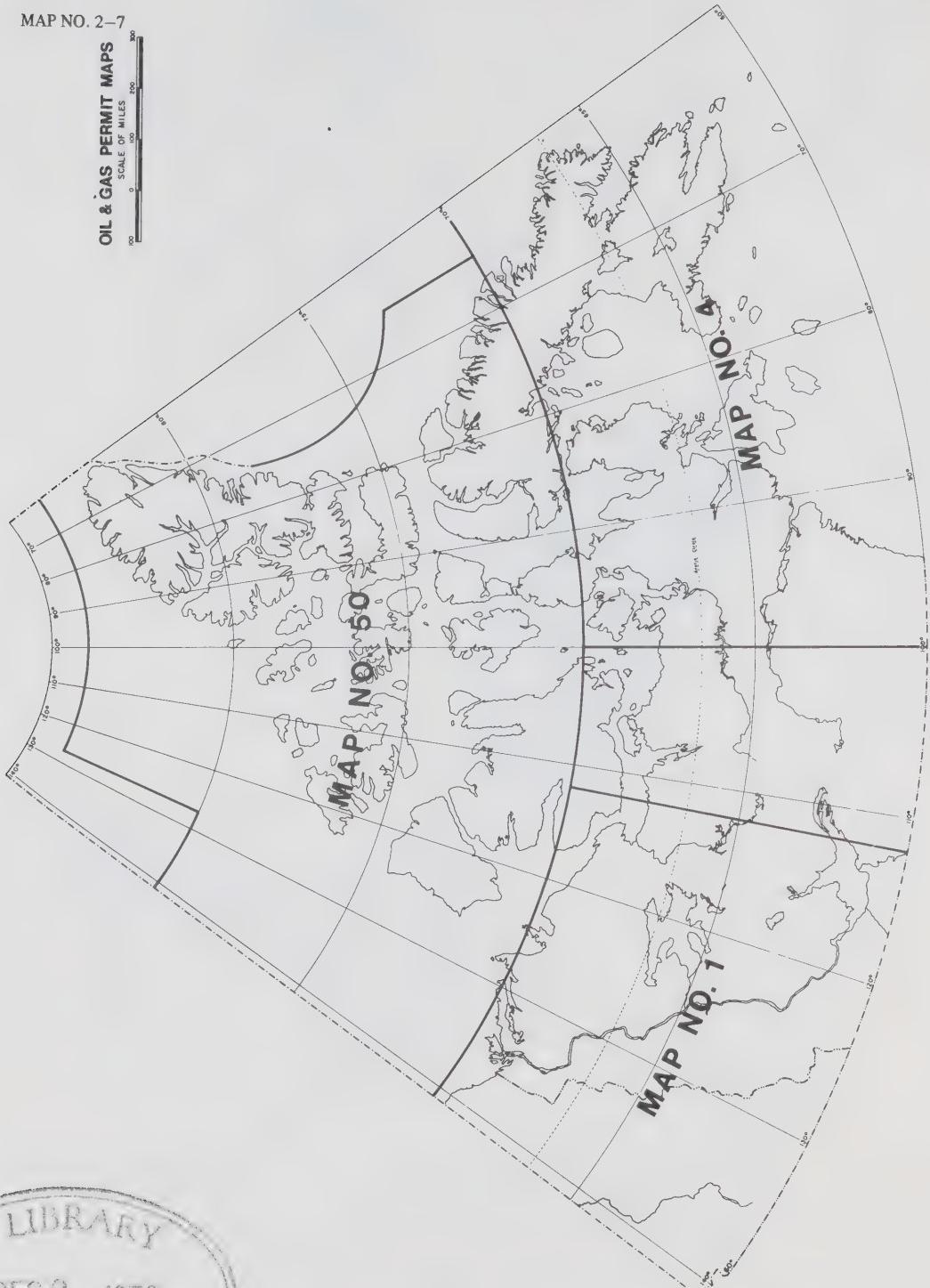
MAP NO. 2-5



MAP NO. 2-6



MAP NO. 2-7



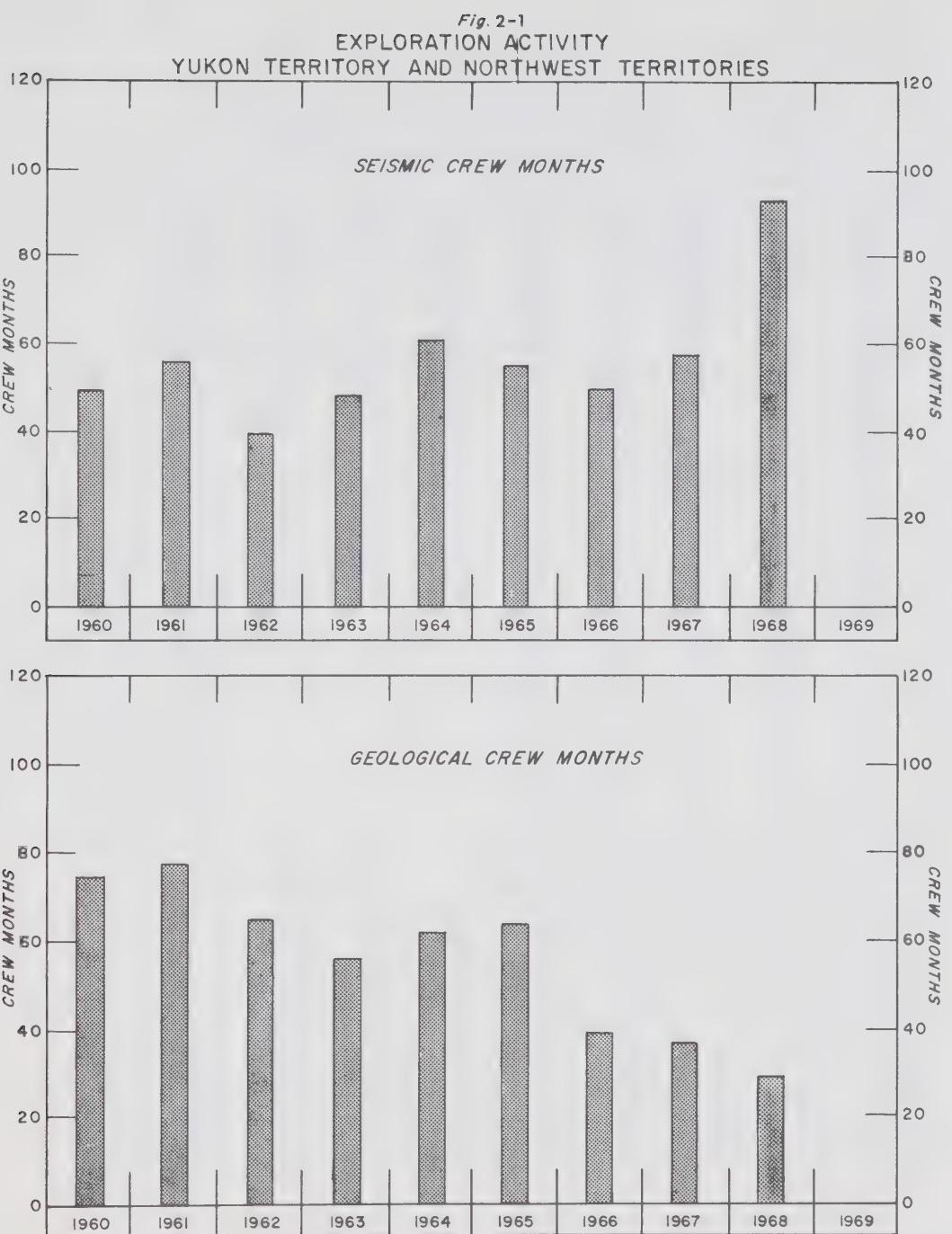


Fig. 2-2
OIL & GAS EXPLORATORY EXPENDITURES

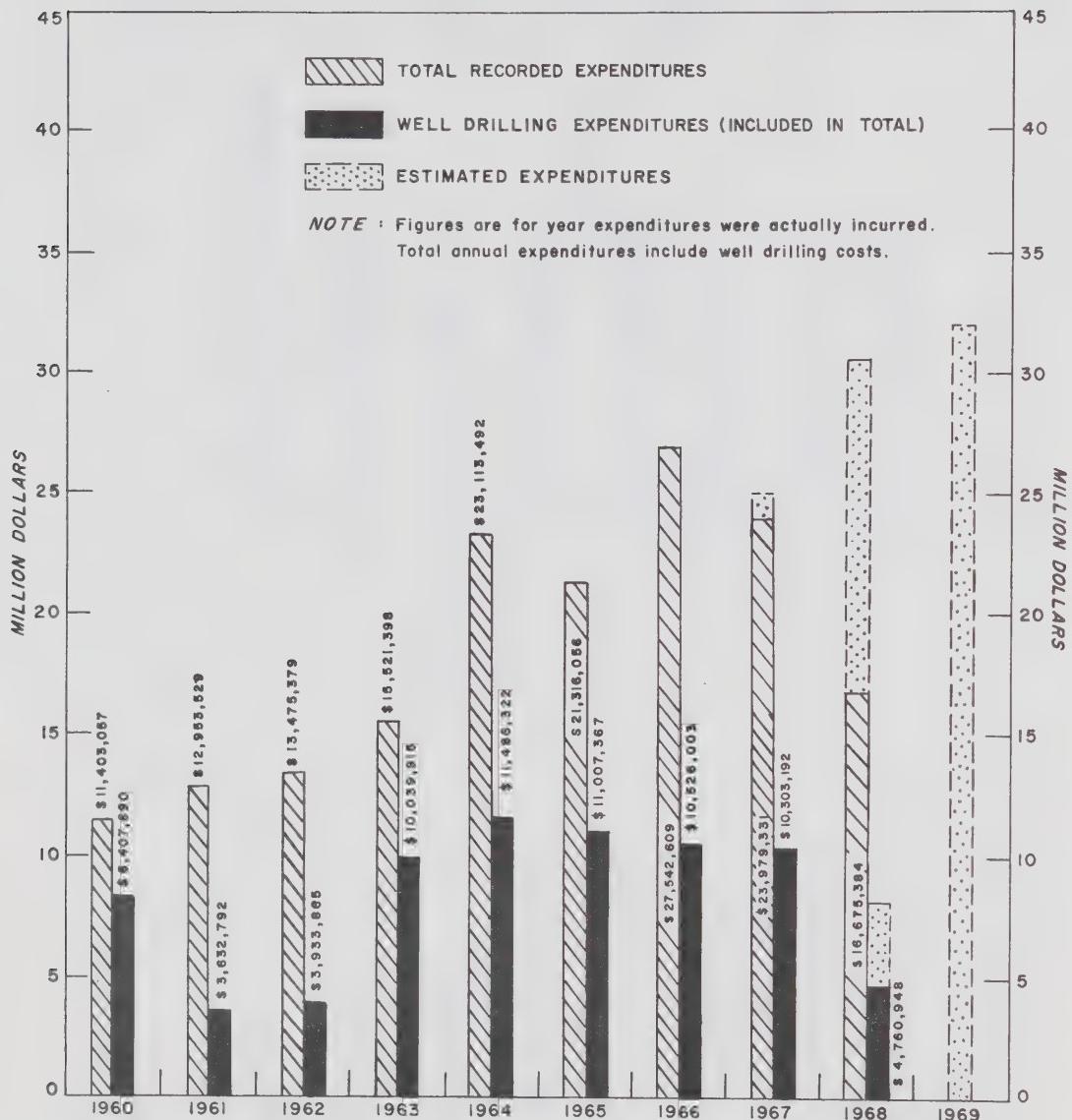


Fig. 2-3
FOOTAGE DRILLED
YUKON TERRITORY AND NORTHWEST TERRITORIES

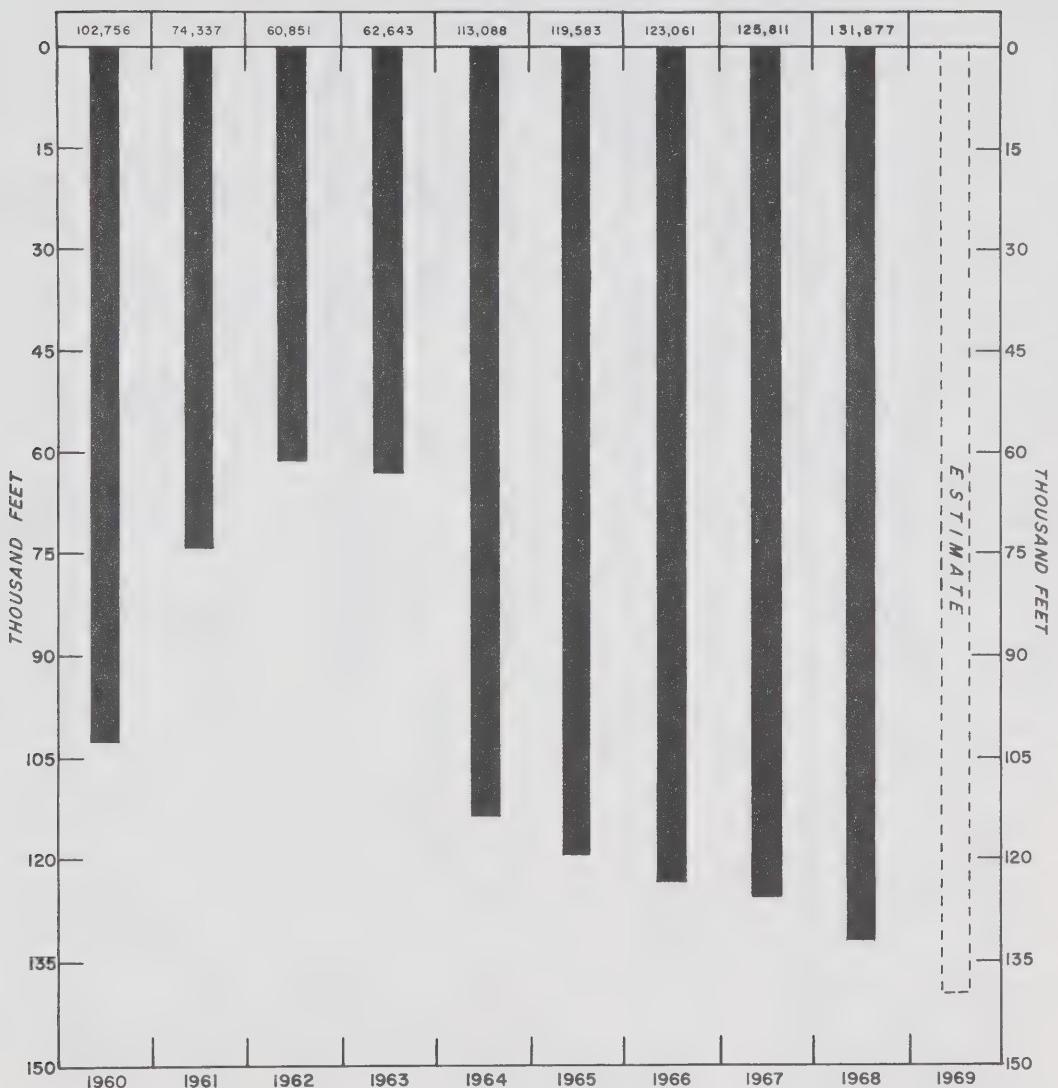


Fig. 2-4

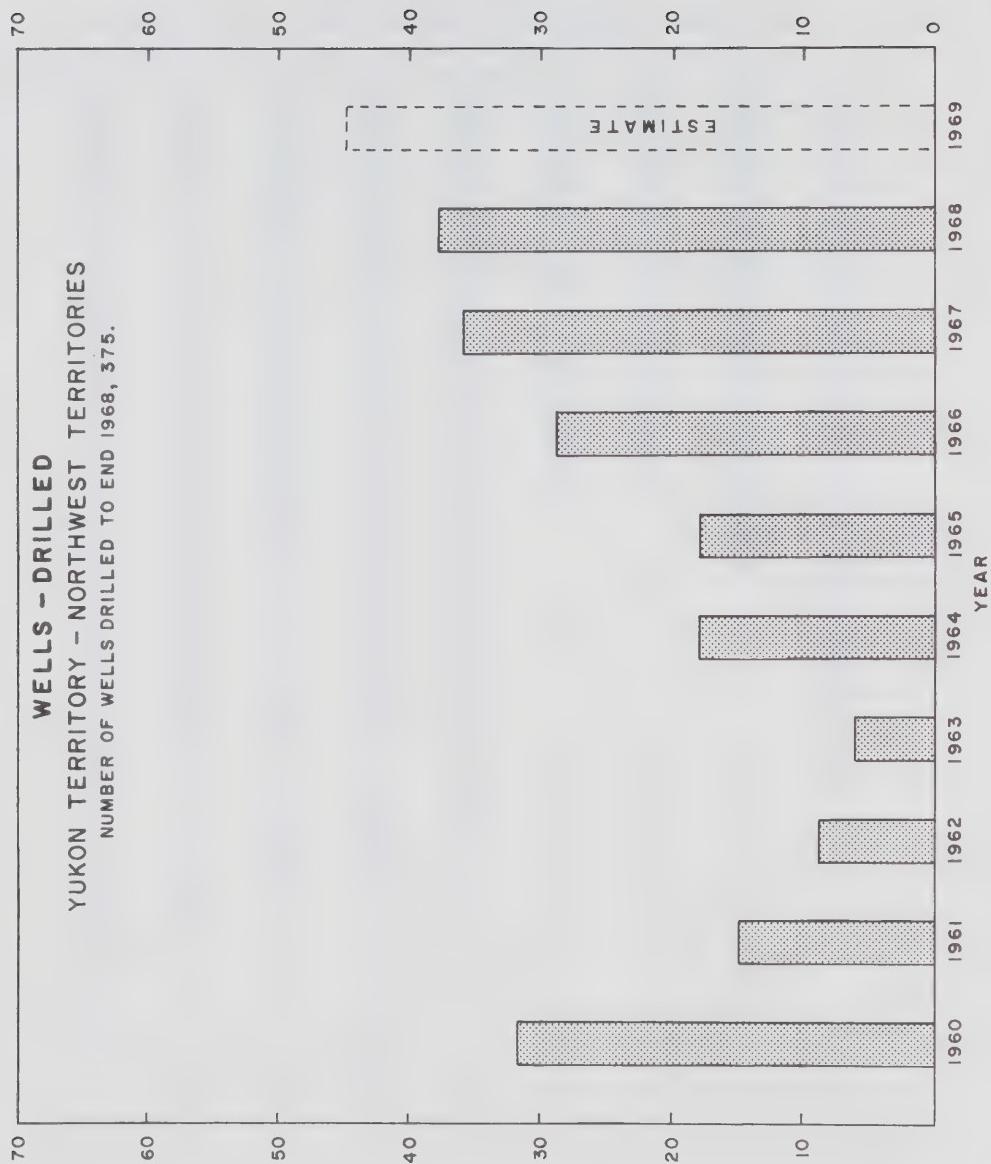


Fig. 2-5
INSTADIANO

PERMIT TERMS AND DEPOSIT REQUIREMENTS PER ACRE

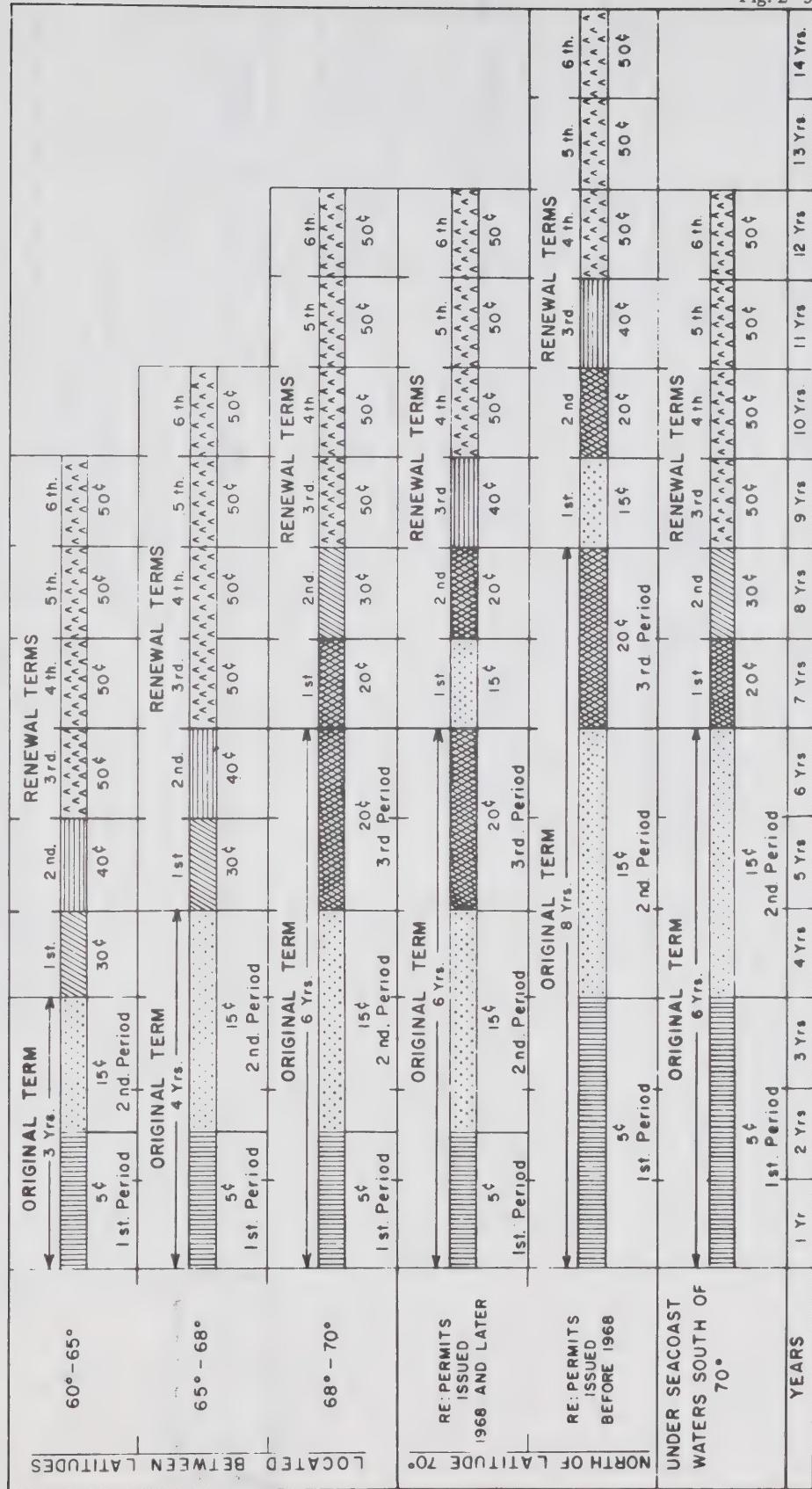
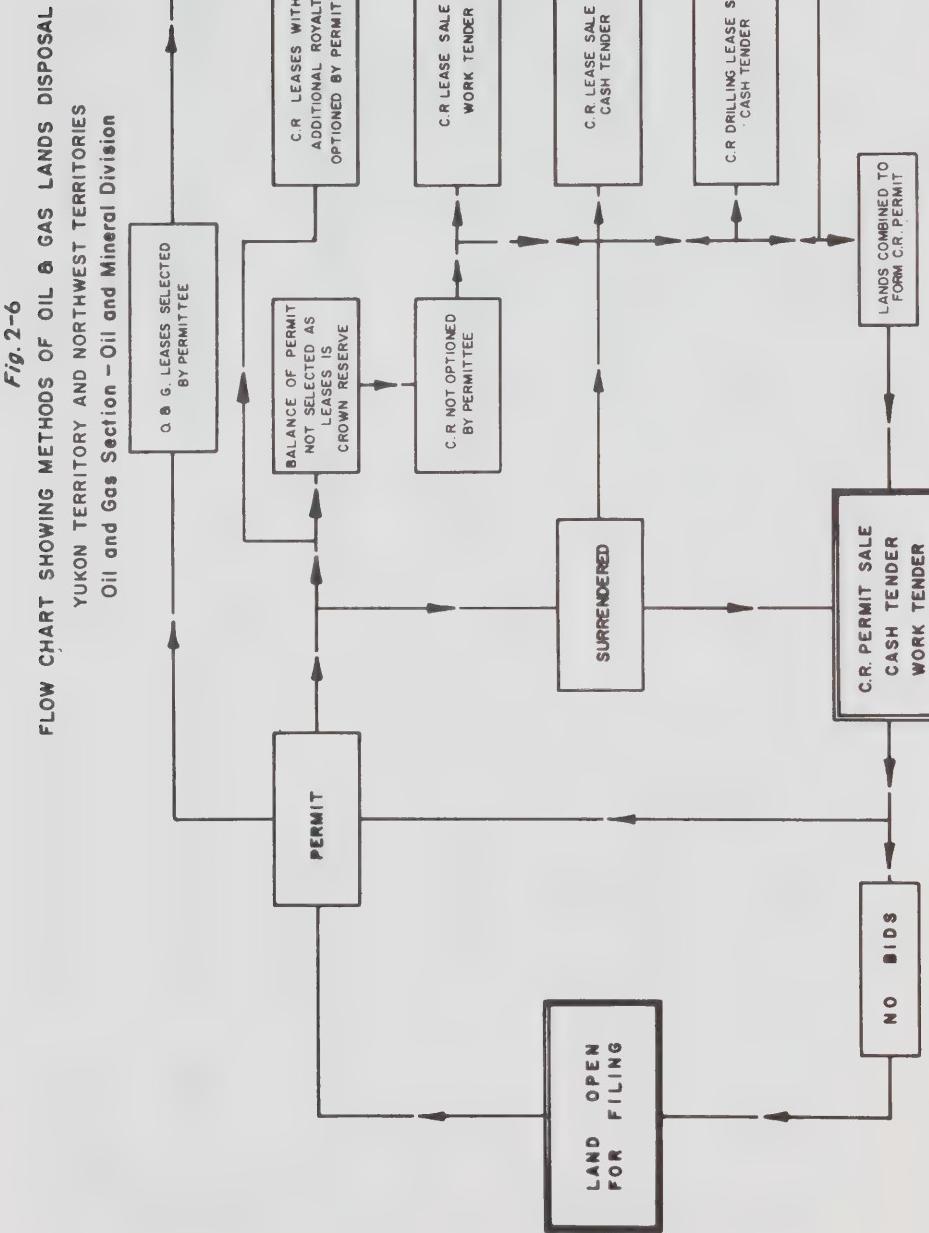


Fig. 2-6



Note: "C.R." means Crown Reserve, a term applied to Oil and Gas Lands available for acquisition by tender only.

Fig. 2-7

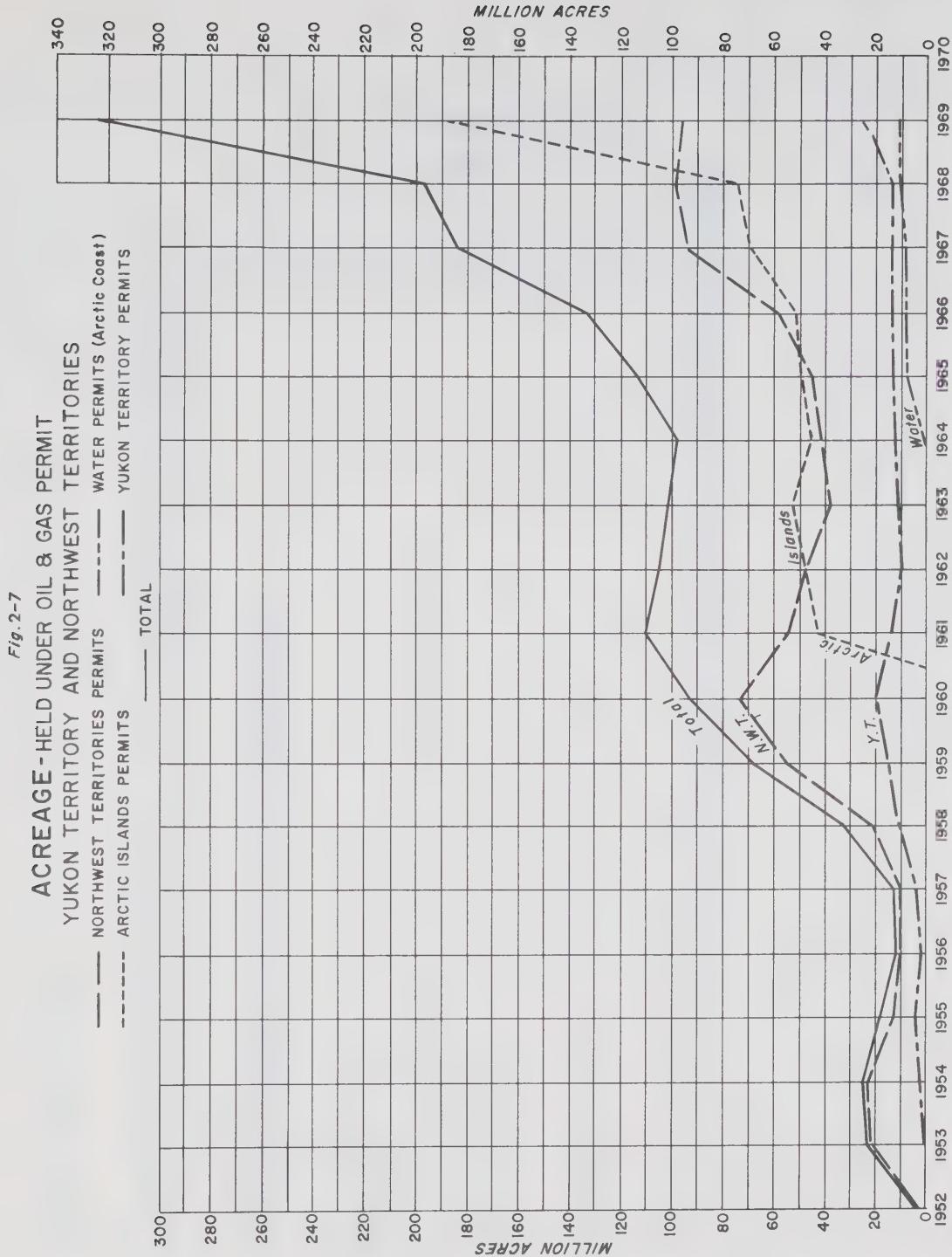


Fig. 2-8

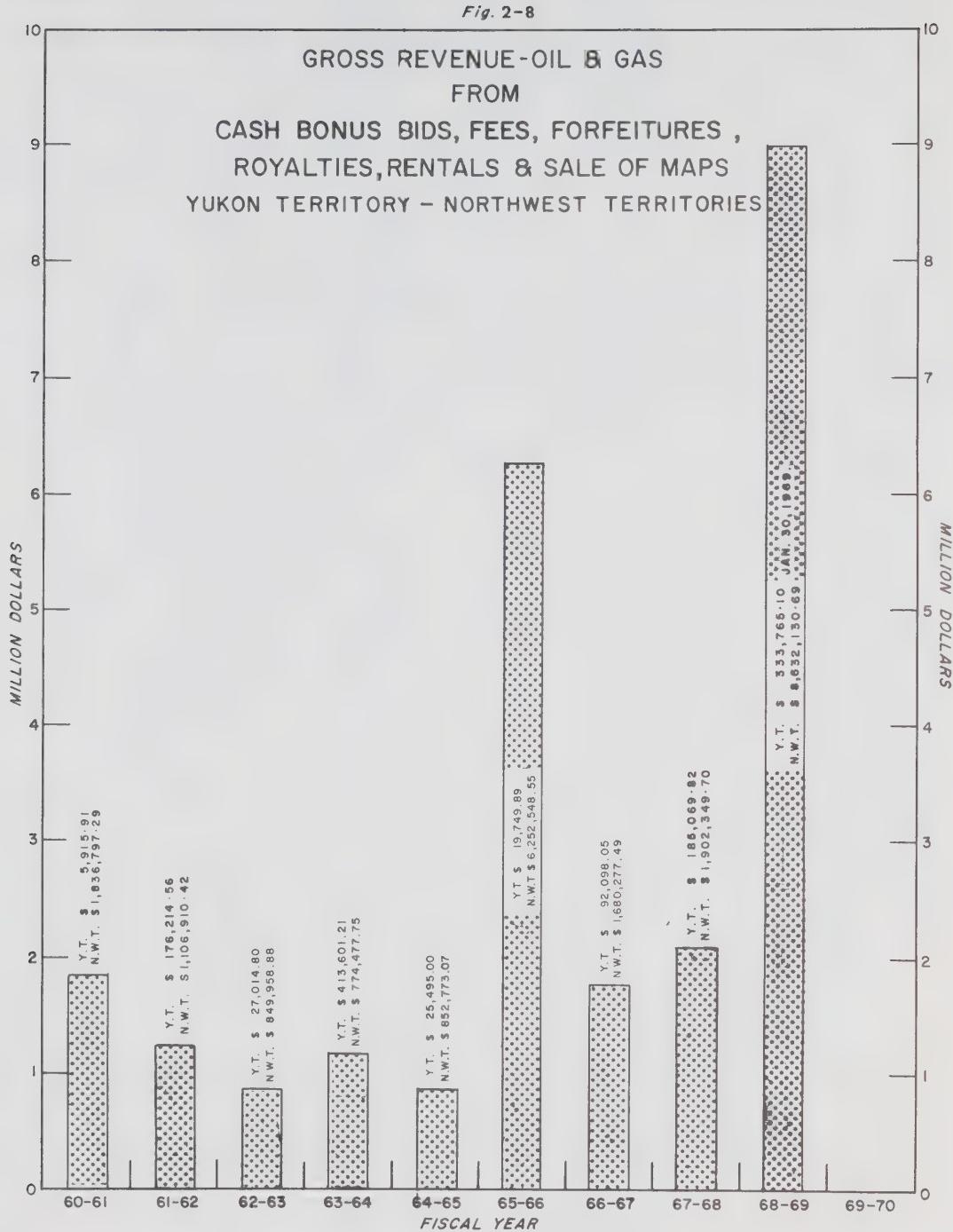


Fig. 2-9

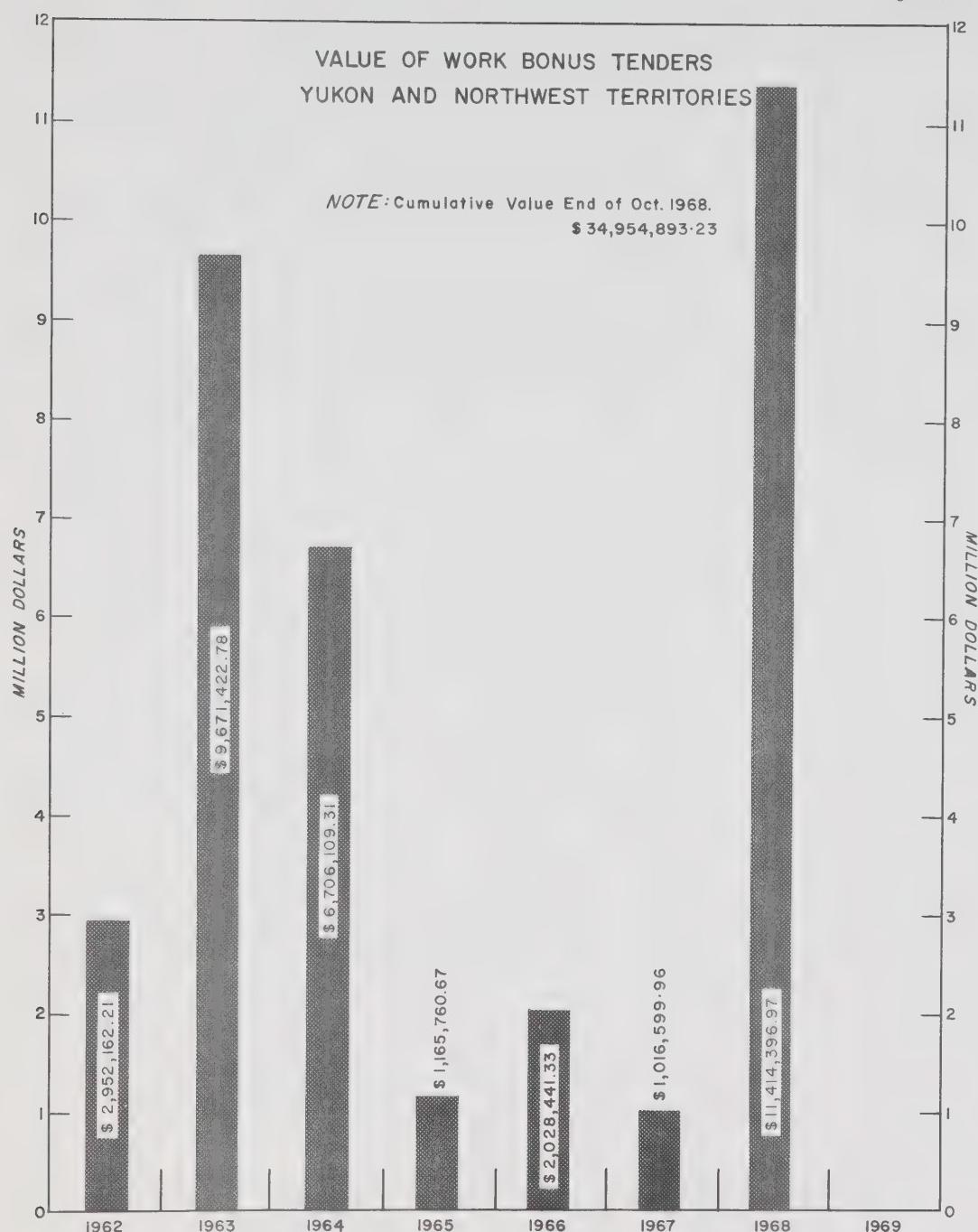


TABLE 2-1

TABLE 2-1
Sedimentary areas, volumes and proven oil and gas reserves

Sedimentary Area (sq. miles)	Sedimentary Volume (cu. miles)	Exploratory wells	Crude Oily (thousands of barrels)			Remaining Proven	Produced Proven	Natural Gas, (millions of cu. feet)
			Produced	Remaining Proven	Total			
					Produced			
Manitoba and Saskatchewan	176,623	168,072	4,457	841,200	791,619	1,632,819	654,105	728,967
Alberta	236,893	341,715	6,812	2,456,681	7,030,049	9,486,730	10,544,054	36,890,431
British Columbia	50,688	115,318	600	86,468	294,246	381,714	1,384,231	7,752,745
Yukon	43,000	64,500	26	—	—	—	—	—
Northwest Territories (Mainland)	204,794	267,133	113	11,389	47,848	50,237	8,584	107,698
Arctic Islands	350,000	663,500	3	—	—	—	—	—

* Source: Canadian Petroleum Association

TABLE 2-2
OIL AND GAS REVENUES NORTH OF 60

Year	Yukon	Northwest Territories	Total
1958 - 59	\$1,548,315.14	\$6,634,330.75	\$8,182,645.89
1959 - 60	39,878.18	2,986,104.62	3,025,982.80
1960 - 61	5,915.91	1,836,797.29	1,842,713.20
1961 - 62	176,214.56	1,106,910.42	1,283,124.98
1962 - 63	27,014.80	849,958.88	876,973.68
1963 - 64	413,601.21	774,477.75	1,188,078.96
1964 - 65	25,495.00	852,773.07	878,268.07
1965 - 66	19,749.89	6,252,548.55	6,272,298.44
1966 - 67	92,098.05	1,680,277.49	1,772,375.54
1967 - 68	185,069.82	1,902,349.70	2,087,419.52

TABLE 2-3
NORMAN WELLS PRODUCTION AND ROYALTIES

Year	Production	Value of Crude to Refinery	Average Well Head Price/Barrel	Crown Revenues
1958	457,086	856,449.51	1.83	234,001.65
1959	430,319	749,073.00	1.77	234,315.00
1960	468,545	619,257.00	1.37	175,981.00
1961	516,979	652,368.00	1.24	92,768.00
1962	566,168	642,095.00	1.10	133,329.00
1963	630,465	600,901.00	.72	69,882.00
1964	574,125	585,139.00	.98	51,258.00
1965	660,770	665,556.00	1.12	178,878.00
1966	741,476	852,549.00	1.15	213,571.00
1967	684,179	532,633.00	.82	106,229.00

TABLE 2-4
NET CASH EXPENDITURES OF THE OIL INDUSTRY NORTH OF 60
(in thousands of dollars)

	CALENDAR YEAR		
	1965	1966	1967
1. EXPLORATION –			
(a) Geological & Geophysical Expenditures	8,100	9,000	11,288
(b) Exploratory Drilling –			
Dry	11,000	6,500	6,097
Productive – Oil	2,000	–	–
– Gas/Condensate	100	3,700	4,206
(c) Land Acquisitions and Rentals	1,500	7,800	4,567
(d) Overhead (not included above)	–	–	–
	22,700	27,000	26,158
2. DEVELOPMENT DRILLING –			
(a) Dry	–	–	–
(b) Productive – Oil	–	–	–
– Gas/Condensate	–	–	–
(c) Overhead (Not included above)	–	–	–
3. CAPITAL EXPENDITURES			
(a) Field Equipment – Oil	–	300	100
– Gas/Condensate	–	–	–
(b) Secondary Recovery and Pressure Maintenance Project	200	–	–
(c) Other	200	300	188
4. OPERATION OF WELLS –			
Including Flow lines and Related Facilities	200	300	376
5. NATURAL GAS PLANTS –			
(a) Capital Expenditures	–	–	–
(b) Operating Expenditures	–	–	–
6. GENERAL –			
(a) Taxes (including income tax)	–	–	–
(b) Royalties	200	200	198
(c) All Other Expenses (not allocated in 1-5)	–	250	622
TOTAL EXPENDITURES	23,300	28,050	27,643



north
of 60

mines and minerals

northern economic
development branch
department of indian affairs
and northern development
government of canada

(f) Pine Point Mines Ltd.

Location	south shore Great Slave Lake
Product	lead, zinc concentrates
Rate of Production	8,000 tons daily
Grade	9-11% combined lead-zinc
Reserves	reported at 40,500,000 tons
Employees	328

High grade ore shipped to Consolidated Mining and Smelting Company smelters at Trail B.C. Lead-zinc concentrates shipped to Japan, the United States, and India.

(g) Echo Bay Mines Ltd.

Location	Great Bear Lake
Product	silver, copper concentrates
Rate of Production	100 tons daily
Grade	76 ozs. per ton silver, 20% copper
Reserves	not available
Employees	87

Concentrates are shipped by barge, winter road and aircraft from the property to rail head at Hay River for trans-shipment to smelters.

Development and Exploration

The Coppermine area of the Mackenzie district has become the scene of the most active exploration work in mining history, beginning in 1966.

P.C.E. Explorations and Coppermine River Mines were the first of some 60 companies that moved into the area to explore the historic region. These two firms succeeded in outlining in excess of 4,000,000 tons of ore averaging 3.00% copper.

Most of the companies in the area undertook intensive programs, consisting of geological, geophysical surveying and diamond drilling. Copper mineralization in the form of bornite and chalcocite is widespread.

The search for copper subsequently spread to the neighboring islands in the Arctic Archipelago. Prospecting permits were issued on Victoria Island and, in addition, a number of claims were staked in the area. Bornite and chalcocite mineralization was reported.

In other exploration activity in the district, Silver Bear Mines has developed silver prospects on a property on Rainy Lake, 35 miles south of Echo Bay Mines. Ore was stockpiled on a silver-copper-bismuth showing on neighboring property.

A silver-copper-cobalt-lead prospect on the Camsell River is under study by Caesar Silver Mines Limited.

3–7.1.2

3–7.1.2 Nahanni District

Producing Mines

Canada Tungsten Mining Corporation

Location	125 miles north of Watson Lake
Product	tungsten-copper concentrates
Rate of Production	350 tons daily (1968)
Grade	1.71% WO ₃ , 0.45% copper
Reserves	934,000 tons
Employees	70

Development and Exploration

Copper deposits in the Redstone River Valley area have been under examination since the early 1969s, with Redstone Mines Limited, which holds 591 claims on the site, undertaking 22,000 feet of diamond drilling and some geological survey work.

Underground exploratory work on a silver-lead showing on Prairie Creek, about 125 miles due east of the Canada Tungsten mine, was commenced by Cadillac Exploration Limited in 1968.

3–7.1.3 Arctic and Hudson Bay District

Producing Mines

There is no producing mine in the Arctic and Hudson Bay district at the present time. North Rankin Nickel Mines operated a copper-nickel mine on the west coast of Hudson Bay from May 1957 to September 1962 until all known ore was exhausted. North Rankin produced 21.3 million pounds of nickel and 5.8 million pounds of copper.

Development and Exploration

One of the world's largest high grade iron ore discoveries was made at Mary River, in the northwestern area of Baffin Island. Exploratory work in 1963–64 confirmed the body to contain approximately 130,000,000 tons of iron ore grading 68.2% iron.

Baffinland Iron Mines Limited was formed by British Ungava Explorations Limited to take over development of this deposit and feasibility studies commenced in 1965. These studies on marketing, shipping and other aspects are continuing.

A large block of claims on a lead-zinc prospect at Strathcona Sound on the northern tip of Baffin Island is being investigated by Texas Gulf Suphur. Some 40,000 feet of diamond drilling were completed by the end of 1968 and further exploration and testing was scheduled to be conducted on the property. Surface exploratory work on a lead-zinc prospect on Little Cornwallis Island was launched in a joint venture by Cominco and Bankeno Mines Limited.

3-7.1 – NORTH OF 60 – NORTHWEST TERRITORIES

The mineral potential of the Northwest Territories was first discovered some 200 years ago, when the Hudson's Bay Company sent Samuel Hearne to the Coppermine area, on the Arctic coast, to search for reported native copper occurrences.

Hearne was not very impressed by what he saw on the rockstrewn plain of the Central Arctic, but since his trip in 1776 the area has continued to intrigue mineral hunters. In 1911–12 the first detailed examination of the Coppermine area was carried out. Further interest was shown in 1930, 1944, 1952 and 1957. Finally, in 1966 the biggest staking rush in Canada's history got under way in the Coppermine region and today it is under intensive examination.

The first mineral production in the Northwest Territories took place on the shores of Great Bear Lake in 1932 with the famous Eldorado radium mine. This property assumed great importance during World War II when uranium was required for the manufacture of the atomic bomb.

Gold was discovered in the Yellowknife area in 1934 and in 1938 the Con Mine came into production. It was followed by four others. Most of these mines closed with the outbreak of World War II. However, activity was renewed and in 1948 the Con Mine was re-opened and Giant Yellowknife, the largest gold producer in the Northwest Territories came into production the same year, followed by Discovery in 1950.

Tundra – the first mine in the Barren Lands – commenced producing gold early in 1964. This operation, which subsequently closed down in 1967 proved the possibilities of operating in remote areas subject to severe climatic conditions.

Since 1964 the mineral economy of the Northwest Territories has moved forward rapidly. When the Pine Point lead-zinc mines opened in 1964 the value of mineral production in the Northwest Territories jumped from \$18.7 million to \$77 million, and is currently \$117 million.

Echo Bay Mines revived mining in the Great Bear Lake area when it developed a rich silver vein close to the old Eldorado mine. Close to the border with the Yukon Territory the first tungsten mine North of 60 commenced production in 1962. It has gone on to become the major producer of tungsten in North America.

With the completion of the Great Slave Lake Railway to Pine Point and Hay River, considerable exploration activity was generated in the Pine Point area.

Pyramid Mining Company, in October, 1965, obtained a good ore intersection in its diamond drilling program, and when news of this was disclosed a staking rush followed. By mid-1966 some 30,000 mineral claims were recorded in this area.

Although many anomalies were drilled, only a few companies were successful in outlining ore.

During the summer and fall of 1966 the activity shifted from the lead-zinc deposits in the Pine Point area to copper in the Coppermine and surrounding areas.

Activities in the three mining districts of the Northwest Territories.

3-7.1.1 – Mackenzie District

Most of the mineral production of the Northwest Territories comes from the Mackenzie district. The value of mineral production from 1934 to 1967 totalled \$587,749,930. There are seven producing mines in the district, including five gold, one silver-copper, and one lead-zinc mine. Six are underground operations and one is open pit.

Producting Mines

(a) Con-Rycon Vol.

Location	1.5 miles south of Yellowknife
Product	gold
Rate of Production	525 tons daily (1968)
Grade	0.65 ozs/ton
Reserves	not available
Employees	225

(b) Giant Yellowknife Mines Ltd.

Location	1.5 miles north of Yellowknife
Product	gold
Rate of Production	800 tons daily (1968)
Grade	0.71 ozs/ton
Reserves	1,628,500 tons
Employees	350

(c) Supercrest Mines Ltd.

Location	1.5 miles north of Yellowknife
Product	gold
Rate of Production	100 tons daily
Grade	0.70 ozs/ton
Reserves	260,000 tons
Employees	operated by Giant Yellowknife Mines Ltd.

(d) Lolor Mines Ltd.

Location	1.5 miles north of Yellowknife
Product	gold
Rate of Production	100 tons daily
Grade	0.67 ozs/ton
Reserves	324,000 tons
Employees	Operated by Giant Yellowknife Mines Ltd.

(e) Discovery Mines Ltd.

Location	50 miles north of Yellowknife
Product	gold
Rate of Production	225 tons daily
Grade	0.48 ozs/ton
Reserves	nil (production ending in 1969)
Employees	80

(c) Mount Nansen Mines Limited

Location	45 miles west of Carmacks
Product	gold, silver concentrates
Rate of production	250 tons daily (1968)
Grade	0.39 – 0.50 ozs per ton gold 16 – 22.3 ozs per ton silver
Reserves	330,000 tons
Employees	60

Development and Exploration

Major development programs are currently under way on two properties in the Whitehorse district.

Anvil Mining Corporation Limited is developing one of the largest lead-zinc mines in Canada with production scheduled to start in late 1969. Located 130 air miles northeast of Whitehorse, it is regarded as one of the most significant developments for the Yukon economy since the Gold Rush.

A major loading facility for ocean-going ships is being constructed at Skagway, Alaska, and improvements are being made to the line and bulkhandling systems of the White Pass and Yukon railway linking Whitehorse and Skagway, a Pacific Ocean port.

The Anvil mine is expected to produce enough ore to supply a 5,500 ton-per-day mill. Preparation of the open pit for production and the construction of the mill building, access road, townsite, dwellings, bridges and shops began in 1968.

Ore reserves of the Anvil mine are estimated at 63,000,000 tons of 9% combined lead-zinc with little more than 1 ounce of silver per ton.

Contracts for the sale of concentrates with Mitsui Mining and Smelting Company Ltd. and Toho Zinc Company Ltd., both of Japan, call for the purchase of the total mine production for the first eight years.

Venus Mines Limited has plans for a possible mill and development work is continuing on its gold-silver prospect in the Windy Arm area of Tagish Lake, southeast of Whitehorse. Extensive exploration has outlined reserves estimated at 138,400 tons carrying 0.39 ounces gold and 11.6 ounces silver.

Exploration of copper prospects has constituted a large portion of the activity in the Whitehorse district, with underground drilling on copper-nickel prospects taking place on property held by Discovery Mines Ltd., near Mile 1167 of the Alaska Highway. Diamond drilling on a copper property south of the Pelly River, 48 miles downstream from Anvil, was carried out on behalf of McIntyre Porcupine Mines Ltd.

Lead-zinc exploration in the Vangorda Creek — Anvil Project areas continues to be important and some work has also been done on manganese showings in the district. Exploratory work by Kerr Addison Mines Limited in the Vangorda Creek area between 1963 and 1968 uncovered a mineralized body containing approximately 5,000,000 tons grading 1.5 ounces silver and 9.5% combined lead-zinc, plus minimum copper and gold values.

3-6.1.4

A primary exploration program in the northeast area of the district was carried out in 1968 by Atlas Exploration Limited. This program was supported by helicopter and fixed wing aircraft.

Hudson Bay Mining and Smelting carried out a surface exploration program on property at Quill Creek, seven miles west of Mile 1111 of the Alaska Highway. The nickel-copper showing was found in 1952 and an extensive surface and underground exploration program was carried out. The program indicated reserves of 737,600 tons averaging 2.04% nickel, 1.42% copper, 0.005 ozs. gold, 0.038 ozs. platinum, 0.027 ozs. palladium, 0.073% cobalt.

The Arrow-Inter America Corporation has halted its underground exploration program on a silver-lead property 40 miles northeast of Mayo. A main adit and several short exploration drifts were driven in the summer of 1968.

Hart River Mines Ltd. has carried out an extensive drilling and soil sampling program on claims 80 miles northeast of Dawson. The company plans to spend an additional \$500,000 on a new phase of its program. The mineralization consists of irregularly banded pyrrhotite and pyrite carrying mainly chalcopyrite, sphalerite and small amounts of galena.

Copper mineralization in the Mayo area is being actively examined by Cyprus Exploration Corporation Ltd. and Bonnet Plume Mines.

Amax Exploration Inc., a wholly owned subsidiary of American Metal Climax Inc. has carried out a geological mapping and diamond drilling program on a promising tungsten property on the Yukon-NWT border at MacMillan Pass.

Atlas Explorations, Hudson Bay Mining Company and Spartan Exploration have been active in primary exploration in the eastern sections of the Mayo district.

3-6.1.2 – Dawson District

Producing Mines

Cassiar Asbestos Corporation Ltd.

Location	65 miles northwest Dawson
Product	asbestos fibre
Rate of production	2,348 tons daily (1968)
Grade	6–7% of 1/16" – 1 1/8" fibre
Reserves	25,000,000 tons
Employees	263

Development and Exploration

Gold, silver and lead prospects are being examined in the Dawson district. The most active explorer is Connaught Mines Limited which is working its Mosquito Creek silver-lead property. The property contains a number of massive galena veins, two of which were high graded in a limited way (25 tons) in 1966.

3-6.1.3 – Watson Lake District

Producing Mines

No mineral production is taking place in the district at the present time.

Development and Exploration

Silver, lead and zinc showings are being actively examined. Hudson Bay Mining and Smelting Co. Ltd. is carrying out an extensive diamond drilling program, as well as mapping and geochemical surveys on a lead-zinc prospect near the Yukon-NWT border.

The prospect was found in 1951 and in 1953 the exploration program was completed, with 10,470,000 tons of mineralization being indicated.

Atlas Explorations Ltd. holds 1,000 mineral claims covering three areas of the Watson Lake district. The Mt. Hundere prospects, located 35 miles north of Watson Lake, contain high-grade lead-zinc mineralization. The work to date indicates a limited tonnage.

Atlas' Fyre Lake prospects, 86 miles southeast of Ross River, contain copper mineralization. The Sheldon prospects, covering seven claim groups in the Ross River area, have revealed lead-zinc mineralization, with varying amounts of silver-gold and copper.

In 1968 a joint venture agreement was made by Atlas with Mitsui Mining and Smelting Co. of Japan on the Sheldon project.

Spartan Explorations Ltd. holds nearly 1,000 mineral claims in the district. In 1967 the company carried out a major exploration and prospecting program in an area east of McPherson Lake and staked 780 claims. The following year it carried out a major prospecting exploration program in the district.

Silver lead prospects are under active study by Stump Mines Ltd. on property at the headwater of the Ketza River, 120 miles northeast of Whitehorse. Adit development and underground diamong drilling have uncovered highgrade silver prospects.

Tintina Silver Mines has re-activated its exploration program on 108 claims covering a silver-lead prospect 100 miles northwest of Watson Lake. Results of original work done in 1962 were considered disappointing and the program was halted.

Mineralization indicating up to 10% zinc has been found by Norquest Joint Venture on a lead-zinc showing near mile 59 of the Watson Lake – Canada Tungsten road.

The Venture is formed by the Anaconda Company (Canada) Limited, Asbestos Corporation (Explorations) Limited, Bralorne Pioneer Mines Limited, Granby Mining Company Limited, New Jersey Zinc Company (Canada) Limited, and Utah Construction and Mining Company.

3-6.1.4 – Whitehorse District

Producing Mines

(a) New Imperial Mines

Location	7 miles from Whitehorse
Product	copper concentrates
Rate of production	2,000 tons daily (1968)
Grade	1.15% copper
Reserves	4,590,000 tons open pit
	..... 5,000,000 tons underground, graded at 2%
Employees	161

(b) Arctic Gold and Silver Mines

Location	8 miles south of Carcross
Product	gold, silver, lead, zinc concentrates
Rate of production	100 tons daily (1968)
Grade	0.52 ozs per ton gold
	..... 14.4 ozs per ton silver
Reserves	37,870 tons
Employees	70

3-5.1 – MINING EXPLORATION COSTS

Costs of exploration North of 60 are higher than those in the settled regions to the south. However, as local services increase, and individual ingenuity and technical advances combine to meet the challenge of the northern regions, these costs are coming down year by year.

Typical exploration costs in the mining industry North of 60 in 1968:

a) Line Cutting		
Barren Land	\$40 – \$ 70 per mile	
Treed Area	\$70 – \$120 per mile	
b) Airborne Geophysical Surveys		
Electro Magnetic	\$15 – \$ 50 per mile	
Magnetometer	\$ 4 – \$ 15 per mile	
Combined	\$20 – \$ 55 per mile	
c) Ground Geophysical Surveys		
Combined E.M. and Mag Survey	\$200 per mile	
Combined Survey and Line Cutting Included	\$250 – \$300 per mile	
Induced Polarization Survey	\$250 per day or \$500 – \$1000 per mile	
Gravity Survey	\$250 – \$650 per mile	
d) Geochemical Surveys		
Sampling	\$1.50 – \$3.00 per sample	
Analysis	\$1.30 – \$3.00 per sample	
To conduct a complete survey	\$2.80 – \$7.00 per sample	
e) Diamond Drilling Surface and Underground		\$ 6 – \$20 per foot
f) Underground Exploration		\$85 – \$90 per foot
Drifting and Raising		
Includes all cost except		
Geology and Engineering		
g) Average Salaries		
Engineer	\$900 monthly	
Geologist	\$800 monthly	
Helper	\$500 monthly	
h) Bulldozer Rentals		
D – 4	\$20 per hour	
to		
D – 9	\$50 per hour	
i) Labour	\$3.00 per hour	
Carpenter	\$4.25 per hour	
Heavy Duty Equipment Operator	\$4.00 – \$5.00 per hour	
j) Camp Costs		\$12 per man per day

3-6.1 – NORTH OF 60 – THE YUKON TERRITORY

The memory of the Klondike Gold Rush of 1896, the most frenzied and spectacular gold rush ever seen, lives on in the Yukon, and in the hearts of adventurers the world over.

Today, the old fever is returning to the Territory as mineral hunters spread deeper into the northern regions looking for the same kind of strike the early prospectors found in the famous Bonanza Creek discovery. By 1966, when placer mining operations in the area finally ceased, the Klondike had produced well in excess of \$200,000,000 in gold.

The development of the Yukon mining industry has been sporadic until recent years. After the Klondike, only minor placer deposits were discovered in the Territory. Little attention was given to lode deposits. The first recorded lode discovery in the now famous Mayo area was made by H.W. McWhorter in 1906 – a silver-lead vein outcropping in Galena Creek near the present town of Elsa. Some production commenced in 1912. Further prospecting was carried out, and in 1919 another important discovery was made on Keno Hill.

Mining by Keno Hill Limited began in 1920, followed by Treadwell Yukon Company in 1923. Operations were suspended in 1942 and revived again in 1948 with the formation of United Keno Hill Mines Limited, who have operated several mines in the area during the intervening years. Until recently, United Keno Hill was Canada's largest single producer of silver concentrates.

Activities in the four mining districts of the Yukon Territory:

3-6.1.1 – Mayo District

Producing Mines

United Keno Hill Mines Ltd.

Location	26 miles northeast Mayo
Product	silver, lead, zinc, cadmium concentrates
Rate of production	154 tons daily (1968)
Grade	38.6 ozs, per ton silver
.	7.5% lead
.	6.5% zinc
Reserves	100,230 tons.
Employees	260

Development and Exploration

Recent exploration activity has centred around silver, lead, zinc, iron, copper and tungsten.

Among the major work being done in the district, Atlas Explorations Ltd. has been actively exploring its 184 claims covering four silver-lead-zinc prospects in the South McQueston Valley within 29 miles of United Keno Hill's Elsa Mine.

Crest Explorations Ltd. has done extensive diamond drilling, beneficiation and feasibility surveys on its 612 mineral claims located east of the Snake River, 150 miles northeast of Mayo. The claims cover a massive high grade Hematite occurrence.

3-4.1 – PROFILE OF A MINE NORTH OF 60 – CASSIAR ASBESTOS

The challenge of mining North of 60 has been met by Cassiar Asbestos Corporation. The development of Canada's northern-most open pit mine, at Clinton Creek, 65 miles northwest of Dawson, YT, is regarded as a model for mining in the northern regions today.

The combination of new technology and the cooperation and assistance of the Federal and Territorial Governments has resulted in an efficient and profitable operation. The experience of Cassiar Asbestos has encouraged others to move with confidence above the 60° parallel.

The Cassiar Asbestos plantsite is located eight air miles from the Alaskan border, and 65 road miles northwest of Dawson. The townsite overlooks the 40 Mile River, three miles upstream from the confluence with the Yukon River.

The region is one of water-eroded valleys and dome-shaped hills. The overburden is mainly silt-laden rock fragments. Spruce, birch and poplar grow in the valleys and on the slopes to 3,500 feet.

Precipitation in the region amounts to an average of 10 inches per year. In summer, the temperature reaches the high 80s, in the winter it drops as low as 70 degrees below zero. Snow is on the ground from early November until April or May.

Ore body

The ore body is located on Porcupine Hill across Clinton Creek valley from the plantsite. Proven reserves are estimated at 25,000,000 tons with 8% asbestos fibre recoverable, ore-to-waste ratio 1 – 2.4, length of fibre $\frac{1}{16}$ " to $1\frac{1}{8}$ ". The ore zone is 400 feet wide and has been drilled to 900 feet in depth.

Development

The original discovery was made in 1957 by an Indian fur trapper, Art Anderson. Adits were driven in 1958 and magnetometer and drilling surveys were completed in 1963. A local contractor constructed an access road in 1965-66.

A 480-foot bridge over the 40 Mile River was constructed between January and April, 1966. Unofficial temperatures to 78 degrees below zero were recorded while the bridge was being constructed.

In the spring of 1966, 28 three-bedroom prefabricated houses, together with kitchen and ablution trailers, were brought to the site from Calgary to establish a temporary camp for plant construction.

Production

The crushing plant, located downhill from the ore body, is equipped with an ore bin heated by hot air circulation around the body of the bin. Serpentine ore is fed into a primary crusher. A belt with a capacity of 350 tons per hour carries ore up to the discharge where a 60" belt transfers the ore to a tramway feeder.

A 5,281-foot tramline – which includes an unsupported span of 2,200 feet between anchor stations – elevates the ore 500 feet to the plantsite at the rate of 300 tons per hour with 70 buckets spaced 180 feet apart on the line. The line reaches a height of 250 feet above

the ground. Each bucket weighs 1,260 pounds, carries $1\frac{1}{2}$ tons of ore and runs on a $2\frac{1}{2}$ " diameter track cable.

The dryer building is of steel frame construction. The ore is dried, crushed and concentrated by rejection to waste pile of all coarse barren material. The ore is then conveyed by belt to a dry rock storage building which has a capacity of 30,000 tons.

An elevated shuttle belt conveyer distributes the ore coming from various sections of the ore body into separate piles to facilitate blending of mill feed. A model 100, 5 cubic yard Payloader moves the ore as required to the hoppers and feeders of sub-floor conveyors carrying ore to the mill service conveyor.

The mill, of laminated timber frame construction, is 102 feet, or seven storeys high, the tallest building in the Yukon Territory. It is covered by a corrugated asbestos shell, with 3" wall insulation.

The mill was originally designed for production of 60,000 tons of fibre per year, but with minor modifications, production can be increased to 80,000 tons.

Milling is a dry process, consisting of five stages of fiberizing and screening for recovery of desired quality and grades of fibre for packaging. Three 125,000 cfm fans provide suction lift for the fibre released from the rock and for dust removal in cyclone collectors.

The fibre is fed into pressure packers and bagged under 2,000 lb. pressure into 100 lb. capacity jute bags. These bags are conveyed to a palletizing machine and strapped in one-ton units for storage and shipping.

Attached to the mill is a fibre storage shed which can handle 1,400 tons of palletized fibre.

The service building contains a heavy duty equipment garage, warehouse, and mechanical, electrical and carpenter shops. It includes a sub-floor hot water heating system in the garage for thawing vehicles and for the convenience of the mechanics. Overhead cranes are installed in the garage and machine shop.

The second floor includes lockers, showers, etc., for employees.

Water is pumped to the mill a distance of 3,088 feet, being elevated 650 feet from Easter Creek dam through a system of aluminum pipe wrapped with heating cable and placed in an insulated box.

A 350,000 gallon steel tank in a wooden housing stores water for fire protection. The main building is fitted with a sprinkler system.

An oil-fired furnace produces steam in the service building and is distributed to the administration building. Mill equipment normally generates its own heating.

Fuel oil is delivered to the plant by 2,300-gallon capacity belly tanks under fibre haulage trailers on a back haul basis, and stored in a 350,000 gallon steel tank.

Electric power is generated by four 1,400 kilowatt diesel generators. Waste heat boilers produce heat for the townsite, supplemented by two 300 h.p. steam boilers in the power house. Cooling water is drawn from 40 Mile River by turbine pumps.

3-3.1.2 – Yukon Quartz Mining Act

The provisions of this Act govern Crown-owned minerals in the Yukon Territory. They are similar to those of the Canada Mining Regulations, except that a prospector's license is not required, the two-post staking method is employed, claim boundaries may run in any direction and a lease is not mandatory after ten years.

The Mining Recorder in each Mining District in the Yukon maintains files and books of record and a current claim map system. Northern Economic Development Branch headquarters in Ottawa disseminates information, and prepares interpretations, directives and instructions when necessary.

3-3.1.3 – Yukon Placer Mining Act

This Act is applicable to placer mining locations in the Yukon Territory. Claims are rectangular in shape and shall not exceed 500 feet in length along the base line of a stream which is marked by two posts on a line parallel to the stream. The side boundaries are lines parallel to the base line and 1,000 feet distant. Work to a value of \$200.00 must be completed annually to keep the claim in good standing.

Royalty is collectable on the basis of $1\frac{1}{2}\%$ of the value of gold shipped from the Yukon Territory (value \$15.00 per ounce for this purpose).

Files, books of record and a claim map system are maintained by the Mining Recorder in each Mining District. Interpretations, directives and instructions are prepared and forwarded by the Northern Economic Development Branch headquarters in Ottawa when necessary.

3-3.1.4 – Territorial Dredging Regulations

These regulations are applicable to both the Yukon and the Northwest Territories. The 15-year lease system is used on a mileage basis on rivers up to a maximum of 10 miles. A minimum of 20,000 cubic yards must be dredged annually subsequent to the third year of lease. A royalty is payable to the Federal Government on production.

The first year's rental amounts to \$100.00 per mile, and subsequent years, \$10.00 per mile.

3-3.1.5 – Territorial Coal Regulations

These regulations are applicable to both the Yukon and the Northwest Territories. Rights may be secured, either by permit for small users, or by lease for major operations.

The location must be as rectangular in shape as possible, and the length must not exceed four times the width.

A royalty of 10¢ per ton of coal produced under lease is payable to the Federal Government.

As a means of stimulating interest exploratory permits may also be secured. These permits have a life span of three years and cover one-quarter of the area of a claim-map.

3–3.1.6

3–3.1.6 – Mine Safety Ordinances and Rules

These Ordinances and Rules apply to both the Yukon and the Northwest Territories. Safety inspections are made of all mines and oil well drilling rigs to insure compliance with the appropriate Ordinances and Rules. The inspections are carried out by the Inspection Services Unit of the Department.

In the Yukon Territory inspectors are also responsible for inspection of industrial installations and operations.

3–3.1.7 – Yukon Blasting Ordinance

Under these regulations underground blasting operations are inspected and the storage and handling of explosives are kept under scrutiny. Candidates for blasting permits are interviewed and examined. Officers of the Inspection Services Unit of the Department carry out the inspections.

3–3.1.8 – Explosives Use Ordinance, Northwest Territories

This Ordinance governs the use and storage of explosives on all service projects. Candidates for blasting permits are interviewed and examined. Officers of the Inspection Services Unit of the Department carry out the inspection.

In addition to his administrative responsibilities in the Mining District each Mining Recorder answers queries and distributes information on prospecting and mining topics.

Overall supervision of Recorders Offices North of 60 is carried out by Supervising Mining Recorders located at Whitehorse, YT, and Ottawa. The principal function of these officers is to ensure that uniformity is maintained in the mechanics of the administration of all the mining acts and regulations.

b) Geological Evaluation Unit

The Geological Evaluation Unit of the Mining Section, Northern Economic Development Branch, provides assistance in the various stages of exploration, development and production of mineral resources by evaluating all the geological, geophysical and geochemical work submitted by individuals and companies as a result of representation work in respect of a claim. This Unit also maintains a library of technical reports submitted as representation work and as work programs under the Northern Mineral Exploration Program which are available for public reading once the confidential period is terminated.

c) Inspection Services Unit

The Inspection Services Unit of the Mining Section is responsible for safety inspections of all operating mines. It is also responsible for claim inspection to ensure adherence to the provisions of existing regulations.

The Unit is responsible for the operation of the Mine Rescue Stations in the Yukon and the Northwest Territories and for the training of mine personnel in the use of mine rescue equipment and first aid.

The Mine Rescue Station at Whitehorse, YT, is equipped with 24 Draeger B-174 four-hour oxygen breathing apparatus and half-hour Scott Air Paks.

The Mine Rescue Station at Yellowknife, NWT, has 18 Draeger four-hour breathing apparatus and 24 McCaa two-hour oxygen breathing machines.

3-3.1 – MINING REGULATIONS

The administration of mineral exploration and development legislation is the responsibility of the Mining Section of the Northern Economic Development Branch. The following acts and regulations apply:

- *Canada Mining Regulations
- *Yukon Quartz Mining Act
- *Yukon Placer Mining Act
- *Territorial Dredging Regulations
- *Territorial Coal Regulations
- *Mining Safety Ordinances and Rules
- *Yukon Blasting Ordinance
- *Explosives Use Ordinance, Northwest Territories

The above-named acts and regulations have three basic objectives:

- a) to provide an administrative system under which exploration and development of minerals can take place in an efficient and orderly manner.
- b) to establish an atmosphere which will encourage both individuals and companies to work in the Yukon and the Northwest Territories.
- c) to ensure that a reasonable share of the returns from mineral production is retained in Canada for the benefit of the people, the Territories and the nation as a whole.

3-3.1.2 – Canada Mining Regulations

These regulations govern the disposition of Crown-owned minerals in the Northwest Territories – except for certain islands in Hudson Bay and James Bay.

In order to prospect for minerals, stake out or record a mineral claim, the individual or mining company is required to hold a valid prospector's license, issued by the Mining Recorder for the Mining District concerned, or from the Chief, Oil and Mineral Division, Northern Economic Development Branch, Department of Indian Affairs and Northern Development, Ottawa.

Claims are marked by four posts with boundaries not greater than 1,500 feet. These boundaries must run as near as possible to astral North, South, East and West. The total area of each claim is not to exceed 51.65 acres.

Work to the value of \$100.00 must be done annually to hold a claim in good standing, and application for a lease must be made within 30 days after the expiration of the tenth year. The Mining Recorder and his staff in each Mining District is responsible for the proper maintenance of all files and books of record, as well as a claim map system.

Information regarding prospecting and mining is disseminated by all media of communication, by the Northern Development Branch in Ottawa, as well as the Mining Recorders. When necessary, interpretations, directives and instructions are prepared at the Economic Development Branch headquarters.

The granting of prospecting permits is a function of headquarters. This program was adopted to encourage the development of remote areas.

MINES AND MINERALS NORTH OF 60

3-1.1 - GENERAL

The mineral resources of Canada North of 60 are immense but they have barely been touched. The Federal Government is encouraging private enterprise to move into the Yukon and the Northwest Territories to develop the vast mineral deposits.

The known deposits are tremendous. The iron ore reserves are in the billions of tons. Lead-zinc reserves are already well over 100,000,000 tons. Copper and asbestos reserves are in the millions of tons.

The potential mineral wealth awaiting development is equally impressive. Within the Northwest Territories there are 710,000 square miles of Precambrian rock and 100,000 square miles of Paleozoic rock that are favorable for minerals (See Map 3-1)

The value of mineral production in the Yukon and the Northwest Territories has increased from over \$33,897,819 in 1964 to nearly \$150,000,000 in 1968. (See Fig. 3-1 and Table 3-1)

In the past four years an estimated \$300,000,000 have been spent or are committed to be spent to bring mines into production. Of this, the Federal Government has agreed to pay approximately \$140,000,000 in rail and road development and assistance programs.

Four major staking rushes have taken place since 1964. The first resulted from the discovery of the major lead-zinc deposits in the Pine Point area south of Great Slave Lake.

In 1966 the presence of extensive lead-zinc mineralisation was confirmed in the Ross River area, 200 miles northeast of Whitehorse, YT, and another staking rush began. A major open-pit lead-zinc mine will commence production in 1969.

History completed a full circle in 1966 when mineral hunters converged on the Coppermine area of the Northwest Territories and in the ensuing months filed a total of 40,000 claims, the largest staking rush in Canada's history.

This area, on the shores of the Arctic Ocean, first attracted attention nearly 200 years ago when in 1776 the Hudson's Bay Company sent Samuel Hearne to the region to search for reported native copper occurrences.

The newest staking rush occurred in the Artillery Lake region, east of Great Slave Lake where nickel showings have attracted hordes of prospectors.

The number of claims staked in the Yukon and the Northwest Territories increased nine-fold, from 5,800 in 1963 to 52,000 in 1968, and current exploration expenditures North of 60 are in excess of \$12,000,000 annually. (See Fig. 3-2)

3-2.1 – GOVERNMENT ASSISTANCE AND SERVICES

The administration of mineral exploration and development North of 60, and the implementation of government legislation affecting them is the responsibility of the Oil and Minerals Division, Northern Economic Development Branch of the Department of Indian Affairs and Northern Development.

The Federal Government offers a number of incentive programs designed to assist interested individuals and companies in the exploration and development of mineral resources North of 60.* These include:

- Northern Mineral Exploration Program
- Northern Roads Program
- Northern Resources Airports Program
- Prospectors' Assistance Program

*see Incentive Programs

3-2.1.1 – Development Analysis Section

The Development Analysis Section of the Northern Economic Development Branch carries out financial and engineering evaluations of resource developments where Federal assistance has been requested.

For example, the Section conducted a study to determine the feasibility of processing concentrates from the Pine Point Mines, NWT.

The Section undertook on behalf of the Anvil Mining Corporation Ltd., a study concerning the construction of roads, bridges, power, communications and townsite facilities at the mine site in the Yukon.

3-2.1.2 – Mining Section

a) Mining Lands Unit

For administration purposes the Yukon and the Northwest Territories are divided into seven mining districts (See Map 3-2). A Mining Recorder is in charge of each of the districts. The districts and the location of the Mining Recorders' offices are as follows:

	District	Office
Yukon Territory	Mayo	Mayo, YT
	Dawson	Dawson, YT
	Watson Lake	Watson Lake, YT
	Whitehorse	Whitehorse, YT
Northwest Territories	Mackenzie	Yellowknife, NWT
	Nahanni	Watson Lake, YT
	Arctic and	
	Hudson Bay	Ottawa, Ontario

TRANSPORT NORTH OF 60

8-1.1 – GENERAL

As the pace of economic development North of 60 accelerates, an economic, efficient transportation system serving the Yukon and the Northwest Territories is being developed by the Federal and Territorial Governments and by private enterprise.

Continuing technological improvements in the various methods of transportation are resulting in greater mobility and lower transport costs.

Physical barriers remain the biggest challenge North of 60. Although areas of the Yukon are no more than 100 miles from Pacific tidewater, the Coast Range Mountains, rising sharply out of the Yukon plateau, seal off the Territory inland.

Several passes through these mountains have provided some links with the Pacific, but the costs of building and maintaining permanent routes through the Coast Range have been formidable.

The great distances of the Northwest Territories, separating the source of resource material from the ultimate destination in southern Canada and overseas, the relatively small volumes of traffic moving into and within the Territories, and the seasonal nature of much of the existing transportation system, all combine to throw up huge obstacles against the speedy development of an efficient service.

The Federal Government, which has jurisdiction over the Yukon and the Northwest Territories, is heavily involved in providing a variety of transport facilities throughout the two regions. On the one hand, it is making direct expenditures in the establishment of the facilities, and on the other, it has a number of programs underway to assist private enterprise in building facilities necessary to the development of resource industries, such as the Northern Roads Network Program and the Northern Resource Airports Program (See Map 8-1)

8-1.1.1 – Rail

Each of the Territories is served by a railway line:

The White Pass and Yukon Route runs from Whitehorse, Y.T., 110 miles to Pacific tidewater at Skagway, Alaska.

The Great Slave Lake Railway, runs from Pine Point, on the south shore of Great Slave Lake, 435 miles south to Grimshaw, Alta., where it connects with the continental rail system.

Comparisons of the freight rates between the two rail lines and between those charged in the rest of Canada are not practical, because of the varied types of service and facilities provided. The Great Slave Lake Railway is still under construction and its rates are therefore not under the regulatory jurisdiction of the Railway Committee of the Canadian Transportation Commission. It is understood that concentrates move from Pine Point on the line at a rate of 1.7 cents per ton mile. The White Pass railway is not a system that can be viewed in isolation. It is part of an integrated truck-rail-water container operation which connects the Yukon with the outside world via Vancouver, B.C. and Skagway, Alaska. Most commodities moving on this system do so under through rates which represent the combined costs of operating the various components of the overall system.

8-1.1.2

8-1.1.2 – Roads

Winter roads are an important means of providing transportation North of 60. In the winter months, when temperatures are constantly below freezing point, rights-of-way can be prepared across plains, tundra, muskeg and frozen lakes. The running surface of packed snow and ice can be used by standard haulage equipment, and in this way ore may be carried south and supplies may be built up in the winter for use during the summer months. These winter roads have in most cases been constructed and operated by private contractors, and in several cases have been subsidized by government funds.

Trucking services, linking the Yukon and the southern Mackenzie District of the Northwest Territories with southern Canada, are available on a year-round basis.

Examples of truck transportation rates for various commodities from Edmonton, Alta., to Hay River, N.W.T., via the Mackenzie Highway, calculated on a hundred weight basis:

Vegetables	\$3.75
Frozen meats	4.22
Fresh fruits	3.75
Flour	3.21
Builder's hardware	3.37
Roofing materials	2.52

Further information may be obtained from local carriers.

TABLE 8-1
ROAD CONSTRUCTION AND USAGE
YUKON AND NORTHWEST TERRITORIES, 1961-70

Year	New Construction		Total Miles in Use	
	N.W.T.	Yukon	N.W.T.	Yukon
1961	63	67	748	735
1962	56	112	763	847
1963	67	65	768	901
1964	38	84	721	936
1965	23	78	749	969
1966	35	32	784	1,001
1967	145	50	894	1,051
1968	47	88	941	1,139
1969	45	84	986	1,223
1970	64	127	1,050	1,350
1971 (planned)	110	45	1,160	1,395

NOTE: Although new roads were constructed, some low-class roads were abandoned.

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- 3-1 Mineral Exploration Development and Mining
- 3-2 Mining Districts, Including Location of Recorders' Officers

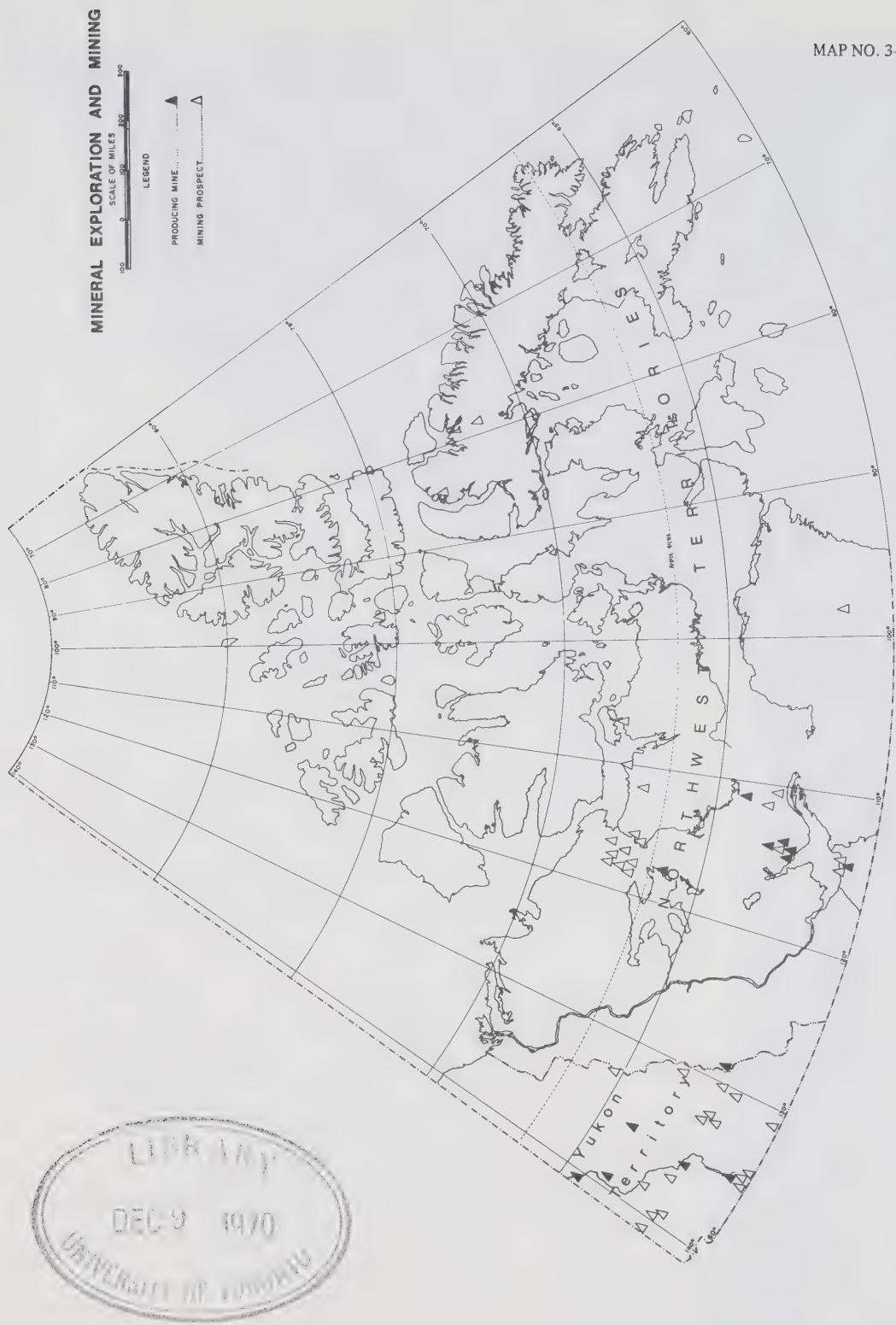
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MAP NO. 3-1



MAP NO. 3-2

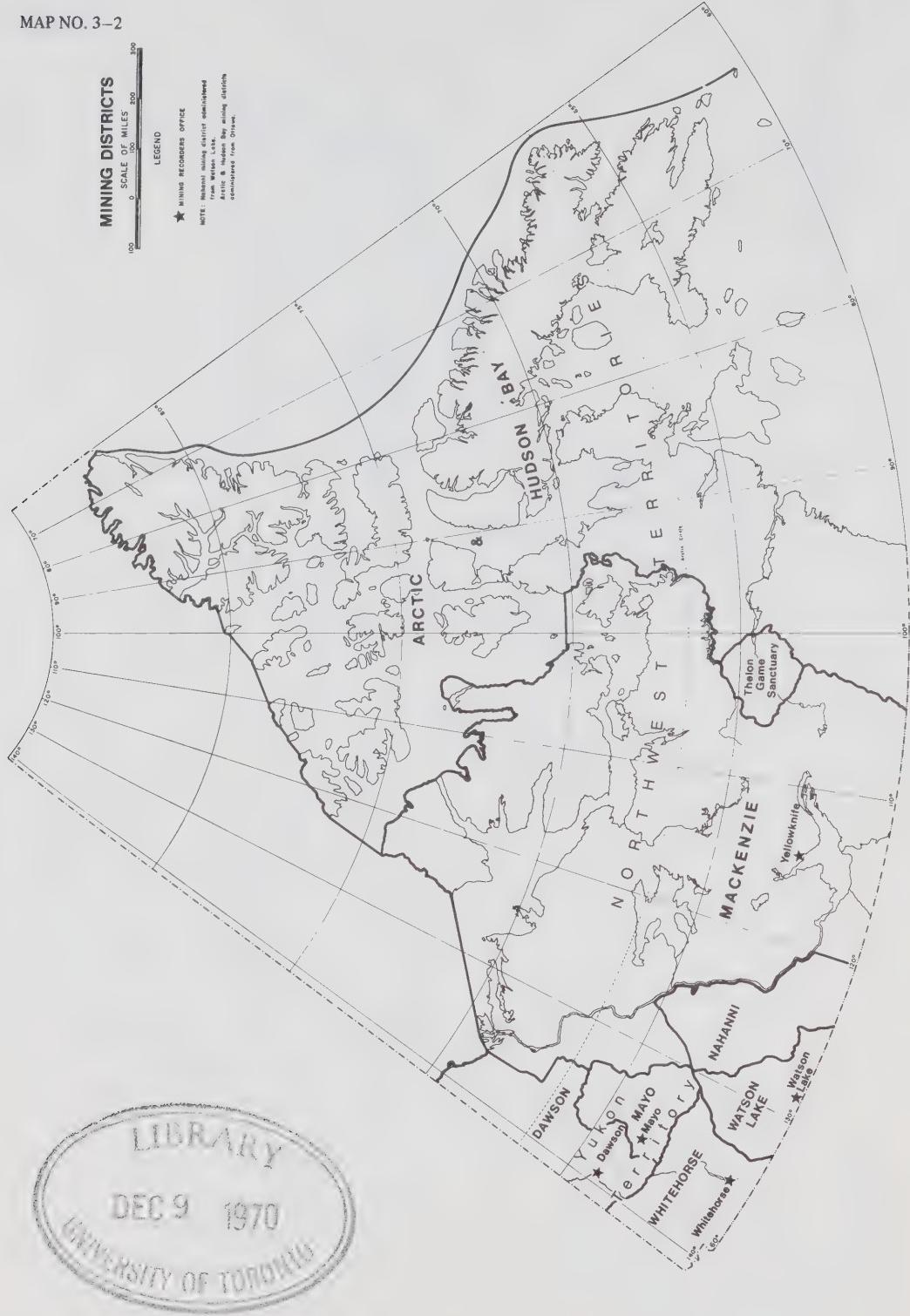


Fig. 3-1

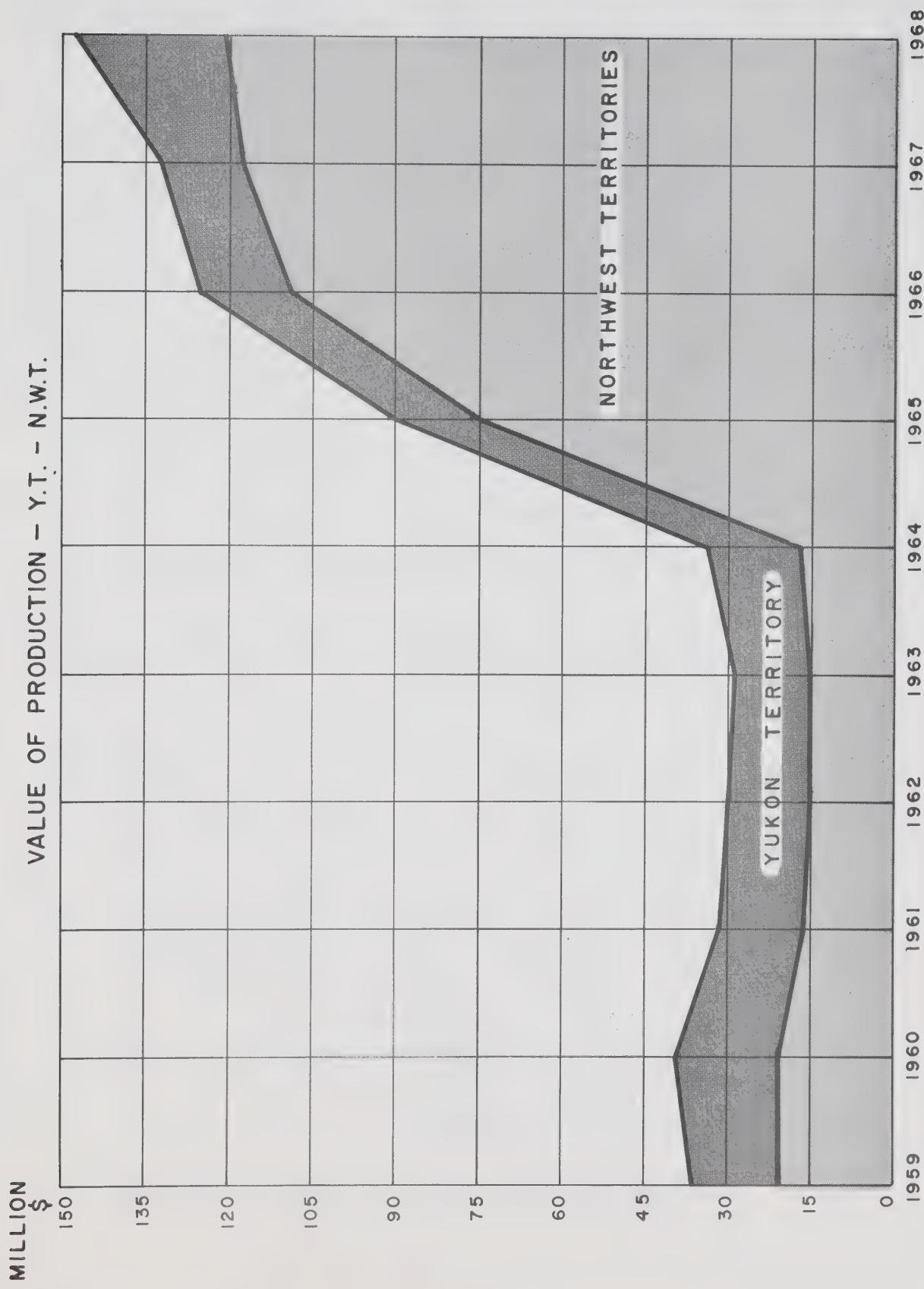
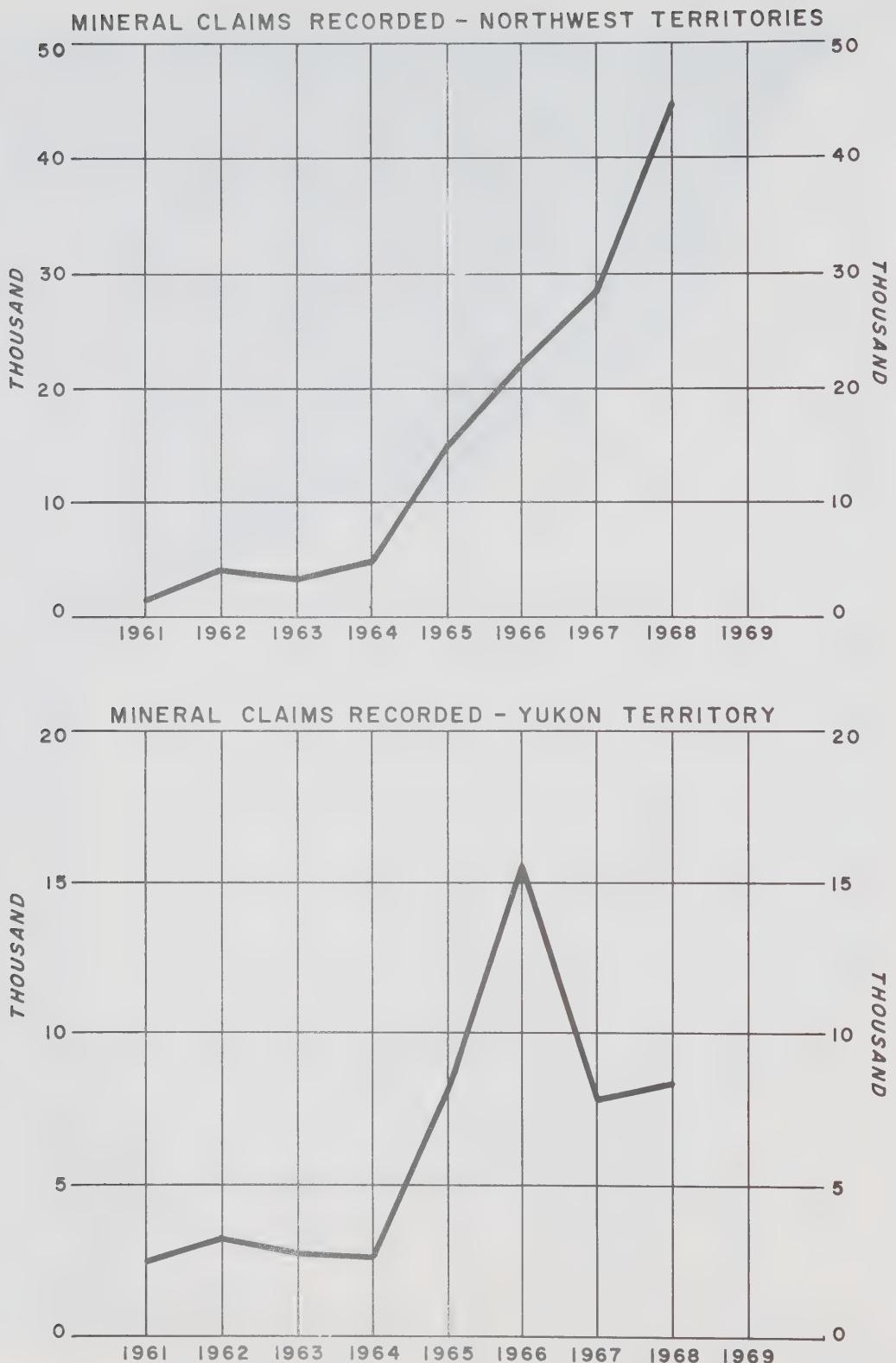


Fig. 3-2



NORTHWEST TERRITORIES

MINERAL PRODUCTION CHART - 1959 TO 1968

Mineral	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968 (a)	cumulative Totals(b)	
Gold \$	13,626,802	14,194,631	14,449,028	14,974,924	14,609,250	15,586,182	17,071,580	15,990,133	14,356,476	13,085,822	266,572,576	
ounces	405,922	418,104	407,474	400,292	387,000	412,879	452,479	424,029	380,304	347,012		
Silver \$	61,937	70,659	73,419	84,814	107,216	91,312	1,490,754	2,325,407	3,429,755	8,938,132	18,126,520	
ounces	70,560	79,473	77,890	72,802	77,468	65,223	1,064,824	1,662,192	1,980,228	3,855,967		
Copper \$	297,157	315,016	270,440	194,928	10,281	354,342	672,065	538,077	946,108	3,936,541		
pounds	986,682	1,040,000	926,480	628,801	32,638	942,400	1,496,805	1,131,126	2,097,800			
Nickel \$	2,689,239	2,669,645	2,604,789	1,503,837	.....	.....	.....	.....	.....	12,850,205	
pounds	3,841,770	3,813,778	3,409,410	1,801,002	.....	.....	.....	.....	.....
Lead . . . . . \$	.....	.....	.....	.....	823,279	25,677,695	31,472,562	35,665,535	35,152,000	128,791,071	
pounds . . . . .	.....	.....	.....	.....	6,125,588	165,662,547	210,659,720	254,753,820	260,000,000		
Zinc . . . . . \$	.....	.....	.....	.....	1,111,016	28,595,474	57,128,344	60,852,900	60,630,000	208,318,734	
pounds . . . . .	.....	.....	.....	.....	7,840,620	189,380,626	378,333,400	419,964,800	430,000,000		
Pitchblend(d), \$	8,155,729	9,231,698	.....	.....	.....	.....	.....	.....	.....	79,477,897	
pounds	919,333	1,077,211	.....	.....	.....	.....	.....	.....	.....
Cadmium \$	516,635	2,769,372	2,551,920	2,565,000	8,402,927	
pounds	185,840	1,073,400	911,400	900,000		
TOTAL \$	24,825,864	26,481,649	17,397,676	16,758,503	14,726,747	17,611,789	76,707,480	110,357,883	117,394,663	121,317,062	726,476,471	
YUKON TERRITORY												
Gold \$	2,247,847	2,652,004	2,371,494	2,050,255	2,084,215	2,183,611	1,698,975	1,639,103	675,725	941,128	266,029,877(c)	
ounces	66,960	78,115	66,878	54,805	55,211	57,844	45,031	43,466	17,900	24,957		
Silver \$	6,192,556	6,416,956	6,538,897	7,551,814	8,450,755	7,894,196	6,462,393	5,868,217	6,701,756	4,778,635	133,027,015	
ounces	7,054,632	7,217,361	6,937,086	6,482,244	6,106,037	5,638,712	4,615,995	4,194,580	3,869,374	2,061,534		
Lead \$	2,290,960	2,166,638	1,712,198	1,615,980	1,867,647	2,744,235	2,766,553	2,386,684	2,141,959	951,117	56,277,307	
pounds	21,592,456	20,286,871	16,769,815	16,290,125	16,978,607	20,418,415	17,851,309	15,975,125	15,299,709	7,034,890		
Copper . . . . . \$	.....	.....	257,098	132,990	.....	.....	.....	.....	3,409,779	5,755,550	12,267,112
pounds . . . . .	.....	.....	880,773	429,000	.....	.....	.....	.....	7,167,919	11,965,800	
Coal \$	58,200	97,156	114,221	115,198	123,675	98,150	85,626	46,390	15,791	.....	2,567,132
tons	3,879	6,470	7,703	7,649	8,231	7,229	8,801	5,670	1,912	.....	
Zinc \$	1,621,375	1,789,287	1,528,100	1,438,554	1,514,520	1,855,512	2,000,396	1,729,027	1,373,151	685,260	34,422,678	
pounds	13,246,532	13,402,899	12,137,418	11,888,876	11,850,706	13,094,653	13,247,653	11,450,510	9,476,545	4,860,000		
Cadmium \$	181,440	206,604	228,296	231,328	326,124	428,399	386,192	306,336	265,997	144,638	5,596,533	
pounds	141,750	145,496	142,685	134,493	135,885	132,222	138,918	118,735	94,999	50,750		
Asbestos . . . . . \$	.....	.....	.....	.....	.....	.....	.....	.....	406,371	10,240,000	10,646,371
tons . . . . .	.....	.....	.....	.....	.....	.....	.....	.....	2,260	64,000	
TOTAL \$	12,592,378	13,328,645	12,750,304	13,136,119	14,366,936	15,204,103	13,400,535	11,975,757	14,990,529	23,496,328	520,834,025	

TABLE 3-1

(a) Preliminary Figures

(b) Cumulative Totals - 1932 to December 31, 1968

(c) Cumulative Totals — 1886 to December 31, 1968
(Figures for tungsten not available)

(d) Figures for years 1932, 1943, to 1953
not available.



northern economic
development branch
department of indian affairs
and northern development
government of canada

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WATER NORTH OF 60

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WATER NORTH OF 60

4-1.1 - GENERAL

Water is becoming recognized as the most important renewable resource North of 60. The development of the Yukon and Northwest Territories will continue to depend on water for transportation and hydro-electric power generation. In addition, attention is now being focussed on the feasibility of diversions southward and on the need to maintain the current high quality of northern waters in the face of increasing commercial activity in the North.

As the region enters a period of sustained industrial expansion, there will be an increasing demand for water needed in resource processing and other industrial uses, and for use by an expanding population. Also, the obligation of Government to protect the right to water of the indigenous population for fishing and trapping of fur-bearing animals is recognized, as well as the need to conserve water for recreation purposes.

There are two dominant features of the northern water regime that influences the supply of water available for use in the Yukon and Northwest Territories. The first is that much of the flow in the two main drainage basins, the Mackenzie and Yukon systems, originates south of the 60th parallel. The second is that the level of precipitation in the North is generally very low. Although maps reveal countless lakes in the North, their existence depends on low evaporation and the fact that drainage is inhibited by underlying permafrost and the nature of the Canadian Shield.

It has been estimated that up to 50% of Canada's fresh water resources are located north of the 60th parallel. Usable water, however, in the form of continuous flows, likely comprises only half of this amount, with the remainder held in dead storage.

4-2.1 – FEDERAL GOVERNMENT SERVICES

4-2.1.1 Department of Indian Affairs and Northern Development

The Water Resource Section of the Northern Economic Development Branch is responsible for the administration of all aspects of water use North of 60. The policy of the Section is:

- *to develop and maintain an optimum Territorial water resource management program
- *to initiate research into all facets of water management methods and procedures
- *to protect the Public interest in the disposition of Territorial water rights
- *to encourage maximum utilization of Territorial water resources for the benefit of the region and the expansion of the northern economy

The Section is responsible for the administration of the Dominion Water Power Act and Dominion Water Power Regulations as they apply North of 60. The Act reserves to the Crown the property rights and the right to the use of all water powers in the Yukon and the Northwest Territories.

The Regulations set out the requirements and procedures to be followed by individuals or corporations wishing to acquire permits and licenses to investigate and develop Federal water power sites. The Regulations also set out the schedule of water power rentals to be paid to the Crown for the use of water for power generation purposes.

In addition to the administration of the Dominion Water Power Act and Regulations, the Water Resources Section has the following responsibilities:

- *drafting and implementing Territorial water rights and water pollution control legislation and regulations.
- *devising and initiating special studies into hydro-electric generating and demand potential in the Territories.
- *in co-operation with other Federal departments and agencies, planning for the expansion of water resource investigation and data gathering programs North of 60, particularly in areas where increased water development activities are anticipated.

4-2.1.2 Northern Canada Power Commission

The Northern Canada Power Commission, a Crown corporation, is the largest supplier of electrical power in the Yukon and Northwest Territories and it operates on the same basis as a private company; revenues must cover all costs.

The Commission is responsible for the planning, and in some cases, operation of power generation facilities. It has demonstrated a very flexible policy toward development of facilities, and to the knowledge of the Commission, no mining development has failed to proceed as a result of power costs or lack of adequate power. Power is provided by the Commission from hydro-electric generating sites and diesel-electric generating plants.

4–2.1.3

4–2.1.3 Stream Flow Records

The Federal Government operates a network of 85 metering stations in the Yukon and Northwest Territories to provide stream flow records on major rivers in the area. This program includes the establishment of approximately 17 new stations each year for the next three years.

4–2.1.4 Water Quality Sampling

The Water Quality Division of the Inland Waters Branch of the Department of Energy, Mines and Resources has installed a limited number of water quality sampling stations North of 60 as part of a national water quality sampling network. At present 37 stations are in use. In addition a program of water sampling in streams adjacent to producing mines has been started.

resources of the Territories, plus three persons from each of the two Territories, under the chairmanship of the Regional Engineer of the Department of Indian Affairs and Northern Development. Boards are responsible for processing applications for a Water Rights Licence, for setting conditions in licences relating to water use and pollution control, for conducting public hearings, maintaining water management records and generally enforcing the Acts and Regulations.

4-2.1.3 – Northern Canada Power Commission

The Northern Canada Power Commission is a Crown Corporation concerned with the planning, construction and management of public utilities on a commercial basis. The Commission operates under Authority of the Northern Canada Power Commission Act, which empowers it to survey utility requirements, construct and operate public utility plants in the Northwest Territories, Yukon Territory, and subject to the approval of the Governor in Council, elsewhere in Canada.

It is a requirement of the authorizing Act that projects undertaken by the Commission shall be self-sustaining. Consequently, rates charged for utilities supplied must provide sufficient revenue to cover interest on investments, repayment of principal over a period of years, operating and maintenance expenses and a contingency reserve.

The Commission is engaged in four main types of operations, including provision of electric service, provision of central heating, provision of water and sewerage and contract work.

In 1970 it was operating 21 electric power plants, five of which were hydro and sixteen diesels.

Contract work related to the construction of utility services and repairs and maintenance of electric equipment for government departments, as required on a recoverable basis.

The Commission was formed in June 1948 under authority of the Northwest Territories Power Commission Act for the purpose of constructing and operating electric power plants in the Northwest Territories for mining and other interests. In 1949 the Act was amended to extend its provisions to include the Yukon Territory. In 1956 the name of the Commission was changed to "Northern Canada Power Commission."

Today the N.C.P.C. is the largest supplier of power in the North and is responsible for approximately 90% of the generation power North of 60. Among its major industrial customers is the Pine Point Mine on Great Slave Lake; United Keno Hill Mines near Mayo, Y.T.; and the Anvil Mine, northeast of Whitehorse, Y.T.

In addition to these large mines, power is also provided for several gold mines such as the Giant Yellowknife and the Con Mine at Yellowknife; and for silver and copper mines such as the New Imperial Mines near Whitehorse.

Power rates vary from under 1 cent per KWH on a wholesale basis, to as high as 20 cents per KWH in remote outlying areas, on a domestic basis. The average cost per KWH is under 2 cents and under 6 cents per KWH for domestic power where the Commission provides the necessary local distribution lines to each residence.

With the rapid development of the North it would appear that, in the public interest, the future role of the Commission will include the provision of large generating and long-distance transmission facilities in order to deliver electrical power to consumers at minimum cost.

4–2.1.3

The Commission already has the basic system for minor power grids in the Yukon, centered at Whitehorse, with its existing transmission line some 225 miles to the Anvil Mine at Faro, Y.T., and in the Northwest Territories where a minor power grid is developing in connection with the Pine Point Mine operation which could be extended to Fort Resolution. At Yellowknife an existing hydro and diesel system supplies power to the city of Yellowknife and the mines in the area.

Studies are now being conducted to ascertain the feasibility of extending existing power generation and transmission systems and integrating these into a single power grid for the entire Yukon Territory and one or more moderate sized power grids for the Mackenzie River Valley section of the Northwest Territories.

For further information write:

Mr. John M. Lowe,
General Manager,
Northern Canada Power Commission,
251 Bank Street,
Ottawa, Ontario.

4–2.1.4 – Stream Flow Records

The Federal Government operates a network of 85 metering stations in the Yukon and Northwest Territories to provide stream flow records on major rivers in the area. This program includes the establishment of approximately 17 new stations each year for the next three years.

4–2.1.5 – Water Quality Sampling

The Water Quality Division of the Inland Waters Branch of the Department of Energy, Mines and Resources has installed a limited number of quality sampling stations North of 60 as part of a national water quality sampling network. At present 37 stations are in use. In addition a program of water sampling in streams adjacent to producing mines has been started.

4-3.1 EXISTING HYDRO-ELECTRIC GENERATING FACILITIES

4-3.1.1 Yukon Territory

Currently there are four hydro-electric generating sites in operation in the Yukon. The Whitehorse Rapids hydro plant, owned and operated by the Northern Canada Power Commission, is a two-unit, 15,000 kilowatt development located on the Yukon River about one mile upstream from Whitehorse. This plant commissioned in 1958, supplies power to a number of government agencies in Whitehorse and to the hospital operated by the Department of National Health and Welfare. It also supplies a substantial portion of the power used privately in the Whitehorse area through the sale of power to a private distributing company, the Yukon Electrical Company.

The Yukon Electrical Company, a subsidiary of Canadian Utilities in Edmonton, Alberta, also operates two small hydro electric generating installations in the vicinity of Whitehorse to produce some of the power it requires for its distribution system in the area. The capacity of these plants is 1,650 kilowatts.

The Northern Canada Power Commission operates a hydro generating installation on the Mayo River about 5 miles north of the community of Mayo. This plant was commissioned in 1952. It has a capacity of 12,000 kilowatts, and supplies power over 32 miles of transmission line to mining properties in the vicinity of Elsa and Keno as well as to a privately owned distribution system, servicing the community of Keno City. The distribution of power in Mayo is handled by the Northern Canada Power Commission.

Dawson City was supplied until 1966 by a hydro generating plant with three 5,000 horsepower generating units. This installation was originally operated by the Yukon Consolidated Gold Corporation to provide power for its dredges along with private city needs. The plant was taken over by the Northern Canada Power Commission in 1966 when the corporation cut back in operations and closed in the fall of that year when the Yukon Consolidated Gold Corporation ceased all operations. Power for Dawson City is now provided by the Commission by means of a diesel generating unit.

4-3.1.2 Northwest Territories

Four hydro generating plants are now operating in the Northwest Territories. The Twin Gorge plant is located on the Taltson River about 175 miles southeast of Pine Point. This plant was completed in 1965 and supplies power to Cominco's Pine Point Mine. The project includes a zoned, earth filled dam rising 70 feet above the floor of the canyon. The dam is approximately 1,000 feet long. Power is generated by a single 25,000 horse power plant generating 18,000 kilowatts. The site has provision for the installation of a second generator of the same size, if demanded. The flow in the Taltson River above Twin Gorge is regulated by a storage dam at Nonachko Lake. Approximately 800,000 acre feet of live storage is controlled by this dam.

The Twin Gorge plant supplies power to the Pine Point area over 175 miles of transmission lines at a rate of 14.0 mills. It is estimated this rate could be halved with a doubling of capacity at the Pine Point mill. The Twin Gorge installation is owned and operated by the Northern Canada Power Commission.

The Snare Rapids Development is located some 90 miles northwest of Yellowknife on the Snare River and was the first plant built by the Northern Canada Power Commission. The plant, which commenced operation in 1948, was built to supply power to Giant Yellowknife Gold Mines and encourage development of the mining industry in general. In 1949 a

4-3.1.2

tie-in from the plant to the town of Yellowknife and to Cominco's "Con" mine was established. The Snare Rapids plant has a capacity of 7,000 kilowatts.

In 1960 the Northern Canada Power Commission constructed a second plant on the Snare River. This plant has been designated Snare Falls and has an installed capacity of 7,000 kilowatts.

All three of the above stations are controlled remotely; those on the Snare River from Yellowknife and the Taltson plant from Fort Smith.

In addition, Consolidated Mining and Smelting Company operates a 4,000 horsepower plant on the Yellowknife river at its outlet from Bluefish Lake. The power is fed into the Yellowknife power distribution system. The plant was originally constructed by Cominco to supply power for its gold-mining operations at Yellowknife.

An additional 16,500 KW of thermal power is produced and distributed in 39 communities by federal government departments and mining corporations.

At the present time, the Northwest Territories have a total installed generating capacity of approximately 80,000 KW, of which 45 per cent is produced by harnessing water power. The hydro generating capacity of the Territories' rivers is considerable, however, and greatly exceeds current requirements. Since the mid-1950's, a number of surveys have been conducted and enabled a quantitative assessment of the undeveloped hydro power resources of the Northwest Territories.

TABLE 4-2
YUKON ELECTRIC POWER INDUSTRY

1. NORTHERN CANADA POWER COMMISSION

Location	Service	Generating Capacity (KW) and Type
Whitehorse	Generation	
	Transmission (Faro)	20,000 hydro 10,000 thermal
Mayo	Generation	
	Transmission (Elsa, Keno City)	5,100 hydro
Dawson City	Generation	
	Distribution	1,250 thermal
		Total <u>36,350</u>

2. YUKON ELECTRICAL COMPANY

Location	Service	Generating Capacity (KW) (all thermal)
Whitehorse	Distribution and Transmission (Carcross)	
Watson Lake	Generating and Distribution	1,480
Carmacks	" "	450
Destruction Bay	" "	500
Haines Junction	" "	550
Teslin	" "	500
Beaver Creek	" "	310
Ross River	" "	260
Old Crow	" "	150
Stewart Crossing	" "	100
Pelley River	" "	100
Swift River	" "	200
Carcross	Distribution	
Keno City	"	
Upper Liard	"	
		Total <u>4,600</u>

3. YUKON HYDRO COMPANY

Location	Service	Generating Capacity (KW) (all hydro)
Whitehorse	Generation	1,650

4-4.1 – POTENTIAL HYDRO-ELECTRIC GENERATING SITES

4-4.1.1 Yukon Territory

A study of the hydro-electric power resources in the central Yukon has recently been completed for the Department of Indian Affairs and Northern Development. The purpose of the study was to conduct a survey of power sites and power demands in that part of the Yukon Territory lying within a circle centered on the town of Carmacks and having a radius of 175 miles. The study was not, however, to include any sites located on the mainstream of the Yukon River. The survey report included:

- *a description of each power site investigated
- *an estimate of hydro-electric power potential for each power site investigated
- *an estimate of the hydro-electric needs of the survey area
- *the best method of hydro-electric power development with or without transmission lines
- *an estimate of the costs of development referred to above

A total of 55 sites or areas were investigated, of which 43 were included in the final inventory. The remaining sites were rejected as not being feasible

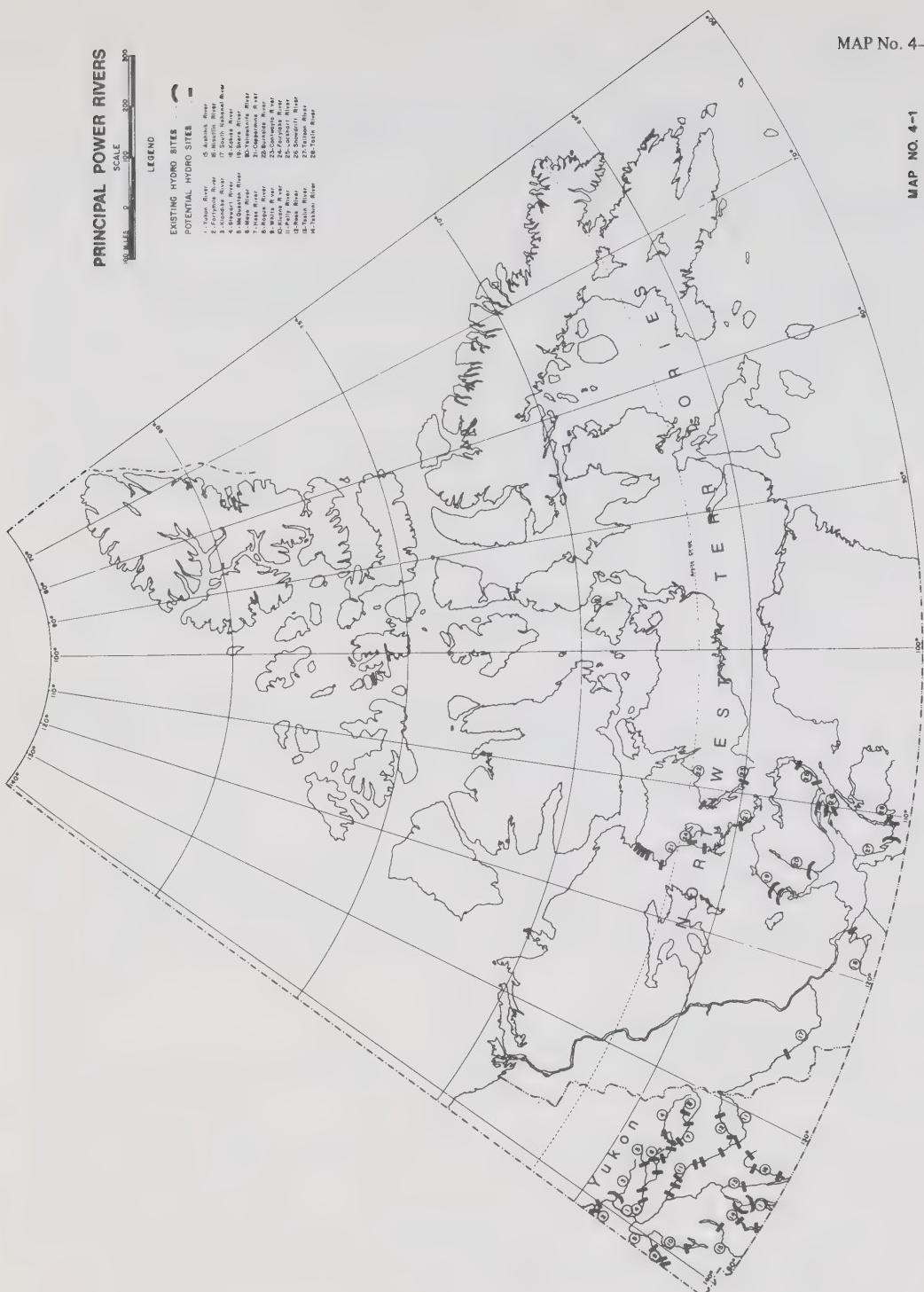
Copies of the inventory may be obtained from

Water Resources Section,
Northern Economic Development Branch,
Department of Indian Affairs and Northern Development,
Ottawa, Ontario.

4-4.1.2 Northwest Territories

Studies similar to that completed for the central Yukon have been commissioned for the Coppermine and southern Great Slave Lake regions of the Northwest Territories.

MAP No. 4-1



4-2.1 – FEDERAL GOVERNMENT SERVICES

4-2.1.1 – Department of Indian Affairs & Northern Development

The Water and Land Use Management Section of the Northern Economic Development Branch is responsible for the management of water use, including pollution control, in the Yukon and Northwest Territories.

The Section is responsible for the orderly development and utilization of water in the expanding economies of the Yukon and Northwest Territories, which involves:

- a) allocation of rights to the use of water in the best interests of the region and of the nation as a whole, through a system of water rights licencing;
- b) comprehensive planning of the development of northern water bodies, including joint management with provincial governments of those water bodies that cross the 60th parallel, and reservation from use of lakes, or streams, and adjacent lands, if necessary, in the interests of long-term planning;
- c) maintenance of the high quality of northern waters; and
- d) maintenance of acceptable engineering standards and practices for the design and construction of all works and undertakings for the use, diversion, storage or treatment of northern waters.

The Northern Inland Waters Act is the primary instrument of the Section for managing northern waters. It provides for water rights licencing, pollution control and comprehensive planning. Under the Act, all users of water are required to obtain a Water Rights Licence from Territorial Water Boards located in Whitehorse and Yellowknife.

The Act and its Regulations went into effect in early 1971. The Section also administers the Dominion Water Power Act and Regulations, which are applicable to all water powers on federal public lands. The Regulations set out requirements and procedures to be followed by individuals or corporations wishing to investigate and develop Dominion water powers.

4-2.1.2 – Other Federal Government Departments

The following departments and agencies have responsibilities for northern waters, of a national nature:

1. *Department of Energy, Mines and Resources* – hydrometric network planning and operation; water quality analysis;
2. *Department of Fisheries and Forestry* – administration of the Fisheries Act;
3. *Department of National Health and Welfare* – safety of water for human consumption; sanitary waste disposal;
4. *Department of Public Works* – navigation channel improvements, harbour facilities;
5. *Department of Transport* – meteorological network; Navigable Waters Protection Act.

TERRITORIAL WATER BOARDS

Implementation of the Northern Inland Waters Act and the Dominion Water Power Act is under the regional direction in each of the Territories of a Water Board. Membership of the Board includes one person from each of the Federal Government Departments concerned with the water

TABLE 4-1
NORTHERN CANADA POWER COMMISSION
PRESENT CAPACITY AND KILOWATT HOUR OUTPUT, 1970

NORTHWEST TERRITORIES

Plant	Utilities	Capacity	KWH Output
Taltson (Hydro)	Power	18,000 KW	110,507,360
Fort Smith Distribution System (Diesel and Gas Turbine)		2,460 KW	
Inuvik (Diesel)	Power, Heat Water, Sewerage Mtce. Services	4,500 KW	15,742,200
Fort McPherson (Diesel) (Operated for N.W.T. Gov't)	Power, Heat Water, Sewerage Mtce. Services	750 KW	1,288,310
Fort Simpson (Diesel)	Power, Heat Water, Sewerage Mtce. Services	1,225 KW	2,783,924
Aklavik (Diesel) (Operated for N.W.T. Gov't)	Power	760 KW	1,027,300
Frobisher Bay (Diesel)	Power, Heat Water, Sewerage	5,045 KW	12,107,295
Fort Resolution (Diesel)	Power	450 KW	855,680
Chesterfield Inlet (Diesel)	Power	400 KW	334,320
Snare River (Hydro) (Snare Rapids) (Snare Falls)	Power	14,000 KW	89,075,060
Standby Diesel		6,150 KW	
Cambridge Bay (Diesel)	Power	1,200 KW	1,996,760
Coppermine (Diesel)	Power	600 KW	885,135
Baker Lake (Diesel)	Power	1,354 KW	2,242,734
Fort Good Hope (Diesel) (Part Year)	Power	375 KW	268,942

YUKON TERRITORY

Mayo (Hydro)	Power	5,000 KW	27,004,960
Whitehorse (Hydro) (Diesel)	Power	20,000 KW	109,333,000
	Power	9,000 KW	
Dawson (Diesel) (Water & Sewerage for Y.T. Gov't)	Power	1,250 KW	2,331,200
Norman Wells (Gas Turbine) (Diesel)	Power	700 KW	1,983,250
		800 KW	

Consolidated approximate Gross Operating Revenue (All Plants) \$9,650,000

4-3.1 – EXISTING HYDRO-ELECTRIC GENERATING FACILITIES

4-3.1.1 – Yukon Territory

Three organizations are engaged in the generation, transmission and distribution of electrical energy for public consumption in the Yukon Territory.

The Northern Canada Power Commission (NCPC) operates 85 per cent of the electrical generating capacity, including the two major hydro plants in the Territory at Whitehorse and on the Mayo River. The Commission has also constructed and operates the transmission lines connecting Whitehorse and Faro, a distance of 225 miles.

The Yukon Electrical Company undertakes the bulk of electricity distribution in the territory, procuring much of the distributed power from NCPC (in the Whitehorse area.) The Company also operates a number of thermal power plants in smaller communities throughout the Yukon, and distributes the power to local users.

The Yukon Hydro Company, affiliated with Yukon Electrical, operates two small hydro generating plants on Porter and MacIntyre Creeks near Whitehorse.

There are 300 miles of transmission line in the Territory, along four separate routes.
(See Table 4-3)

At the present time, the Yukon Territory has a total installed electrical generating capacity of just over 40,000 KW, of which 90 per cent is produced by harnessing water power. The hydro generating capacity of the Territory is immense, however, and current utilization of the potential capability is but a "drop in the bucket". Since the mid-1940's, a number of surveys have revealed quantitatively the tremendous hydro-electric power resources of the Yukon.

(See Table 4-4)

The surveys do not include development of the headwaters of the Yukon River by diversion to tidewater. Preliminary studies have indicated that up to 3,000,000 kilowatts of generating capacity could be developed although such a project would greatly reduce the hydro capacity of the Central Yukon.

4-3.1.2 – Northwest Territories

Three organizations are engaged in the generation, transmission and distribution of electrical energy for public consumption in the Northwest Territories.

The Northern Canada Power Commission operates 90 per cent of the electrical generating in the Territory, and has constructed and maintains 300 miles of transmission line from the two major hydro developments in the Territory on the Snare and Taltson Rivers to users in Yellowknife, Fort Smith and Pine Point. The Commission also operates a number of thermal plants at communities throughout the Territory, and distributes the power to local users.

Northland Utilities Limited generates and distributes power for the communities of Hay River, Fort Providence and Enterprise.

Plains Western Gas and Electric Company is engaged in distribution of electrical power to users in Yellowknife. In addition, the Departments of Indians Affairs and Northern Development, and Transport operate generating and distribution systems in a number of far northern communities not serviced by NCPC or the private sector. (See Table 4-5)

TABLE 4-3
YUKON TRANSMISSION LINES

Route	Distance (miles)	Voltage	Owner
Whitehorse to Carcross	42	23 KV	Yukon Electric
Whitehorse to Carmacks	100	69 KV	N.C.P.C.
Carmacks to Faro	125	138 KV	N.C.P.C.
Mayo to Keno City	32	69 KV	N.C.P.C.

TABLE 4-4
YUKON POWER RESOURCES

Area	Sites Identified	Estimated Installed Capacity (KW)
1. Central Yukon		
a) Main Stem – Yukon River	10	4,477,000
b) Tributary Rivers	26*	1,480,000
2. Watson Lake area	3	410,000
3. Fort Liard area	2	125,000
	Total	<u>6,492,000</u>

*estimated unit cost of power less than 25 mills per kilowatt hour (1967)

TABLE 4-5
NORTHWEST TERRITORIES ELECTRIC POWER INDUSTRY

1. NORTHERN CANADA POWER COMMISSION

Location	Service	Hydro Generating Capacity (KW)
Yellowknife (Snare River)	Generation and Transmission	14,000 hydro
Twin Gorges (Taltson River)	Generation and Transmission (Ft. Smith and Pine Point)	18,000 hydro
		32,000
Location	Service	Thermal Generating Capacity (KW)
Yellowknife	Generation	6,000
Frobisher Bay	Generation and Distribution	6,000
Inuvik	" "	4,500
Fort Simpson	" "	1,500
Baker Lake	" "	1,400
Cambridge Bay	" "	1,200
Fort Smith	" "	1,000
Norman Wells	" "	900
Fort McPherson	" "	750
Aklavik	" "	750
Coppermine	" "	600
Fort Resolution	" "	450
Chester Field Inlet	" "	400
Fort Good Hope	" "	400
Pine Point	Distribution	
	Total	25,900

2. NORTHLAND UTILITIES LIMITED

Location	Service	Thermal Generating Capacity (KW)
Hay River	Generating and Distribution	2,500
Fort Providence	" "	150
Enterprise	" "	approx. 100

TABLE 4-6
NORTHWEST TERRITORIES POWER RESOURCES

Area	Sites Identified	Estimated Installed Capacity (KW)
1. North West Cordillera Region	2	1,150,000
2. South West Cordillera Region	5	955,000
3. Lower Dubawnt-Kazan Basin	6	398,000
4. Thelon-Hanbury Basin	4	320,000
5. Lockhart River	6	329,000
6. Coppermine River	6	278,000
7. Tazin River	3	26,000
	Total	<u>3,456,000</u>

4-4.1 – POTENTIAL HYDRO-ELECTRIC GENERATING SITES

Four reports on electric power potential in the Yukon and Northwest Territories are available to the public at \$15.00 each (French and English):

1. Hydro-electric resources Survey of the Central Yukon Territory (2 volumes)
2. Power Survey of the Central Mackenzie District (2 volumes)
3. Power Survey of the Liard River Basin, Yukon and Northwest Territories
4. Power Survey of the Kazan, Dubawnt, Thelon and Hanbury Rivers, Northwest Territories.

Inquiries may be directed to:

Director,
Northern Economic Development Branch,
Dept. of Indian Affairs & Northern Development,
400 Laurier Ave., W.,
Ottawa 4, Ontario.



north
of 60

northern economic
development branch
department of indian affairs
and northern development
government of canada

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FORESTRY NORTH OF 60

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- 5-1 Wood Utilization

FORESTRY NORTH OF 60

5-1.1 – GENERAL

The forests North of 60 remain an almost untapped resource. An estimated 77,000 square miles of productive forest in the Yukon and the Mackenzie District of the Northwest Territories hold an estimated 23 billion cubic feet of merchantable timber.

Because the Territorial forests are spread over such a vast area it has not yet been possible to complete a total inventory of all the timber resources. The Federal Government is now gradually expanding and updating inventory figures based on actual sampling of the more accessible stands of timber. By careful estimation of the remainder, foresters have calculated that the Northwest Territories have a minimum of 14 billion cubic feet of merchantable timber, and the Yukon Territory 9 billion cubic feet.

The northern limit of tree growth in the Territories is marked by the “tree line” which runs roughly along a line southeast from the mouth of the Mackenzie River, on the Beaufort Sea, to Churchill, Manitoba, on Hudson Bay (Map 5-1). The Territorial forests are classified within the regional system of Canadian forests as the Boreal region. The most common species in the region are white and black spruce, lodgepole and jackpine, balsam poplar, trembling aspen and white birch. Also found are balsam fir and tamarack.

Up to the present time white spruce has been the only commercial species exploited to any extent North of 60. The best stands are found on the alluvial flats of the rivers where excellent growing conditions and natural fire protection have allowed the trees to reach maturity at 150 years. It is not uncommon to find spruce over 24 inches in diameter and 100 feet tall along the Lower Slave River in the Mackenzie District, or on the Liard River in the Yukon Territory and the Mackenzie District.

Mature white spruce average between 20,000 – 25,000 board feet per acre. In some instances these stands have yielded as high as 40,000 board feet per acre.

Associated with the spruce is the balsam poplar which may grow to 30 inches in diameter. Studies have shown balsam poplar can be peeled for plywood, but it has so far not been economically feasible. Generally, the balsam stands are restricted to the southern half of the Yukon Territory and the southern third of the Mackenzie District.

Jackpine is believed to be the most common species North of 60, covering thousands of square miles in both Territories. Individual trees seldom attain a diameter greater than 14 inches. However, some early estimates suggest the jackpine may occur in sufficient volumes in some areas to sustain a pulp mill.

The rotation age of the forest varies widely, ranging from 200 years for spruce in the Mackenzie Delta area near the Arctic Ocean, down to 120 years for spruce, 90 years for pine and 70 to 80 years for poplar in the Southern Regions. These latter are probably equivalent to similar stands in central Alberta and British Columbia.

In addition to its value for commercial purposes, the forest resource North of 60 has considerable value in relation to game preservation, erosion control, and to the general aesthetics of the area.

5-2.1 – DEVELOPMENT

Up to the present time industrial utilization of the northern forests has been relatively small in comparison to non-renewable resource development but the value of the northern forests for the production of timber products and as a part of the natural environment is now beginning to emerge.

In recent years there has been a marked increase in the number and size of forest operations in the Territories and the demand for timber is continuing to increase, but forest production has been geared to supply limited local markets only with a portion of the Territories requirements being supplied from the south. This, however, is not indicative of what the northern forests could actually produce if called upon to do so, and forest-based industries would appear to have considerable potential for future development. It is estimated that the softwood allowable cut for the Territories could exceed 40 million cubic feet annually although full development of this potential will depend upon the establishment of economic markets and transportation facilities. Also, a large proportion of this annual cut is made up of small diameter wood only suitable for pulp or some other fibre process and it may perhaps be in this area that the forest resources of the North will find their principal use in the future.

Recent developments in timber harvesting methods, combined with increasing demand for forest products have stimulated forest industries interest in the North, with a number of new firms having already become established, and the prospect of large-scale integrated forest products operations appears likely within the next few years. These increasing demands are expected to result in improved quality of northern forests products and raises the necessity of better managed forests and efficient forest industry North of 60.

In order to ensure proper management of the forest resource and provide adequate timber supplies to meet large capital investments by industry, procedures are being developed for the allocation of large-scale cutting rights over extended time periods of up to ten years.

5-3.1 – ADMINISTRATION

The Northern Economic Development Branch of the Department of Indian Affairs and Northern Development is responsible for the management of the forest and forest land resources North of 60. These responsibilities include timber management and administration, forest protection, and construction and maintenance of public campgrounds along the Territorial highways, the regulation of surface land use operations.

Development Branch policies are implemented by the Yukon Forest Service, with headquarters in Whitehorse, Y.T., and the Mackenzie Forest Service, with headquarters in Fort Smith, N.W.T.

The Forest Services were organized in the 1940's, primarily as forest protection and fire suppression units. Gradually, they were expanded to include timber administration. General improvements, carried out over the years, have led to the present modern, relatively well-equipped organizations.

Forest management offices have been established in each of the various administrative districts of the two Forest Services. The resident officer is the Federal Government's forestry representative in that area. In addition, rangers, summer seasonal personnel and lookout men are positioned at strategic points during the fire season. (See map 5-2, 5-3).

Because of the large areas involved and the limited number of personnel and communication roads a system of protection priorities has been established. The system is based on the relative values of the property protected. The areas of priority are mainly those in which the highest concentration of value exists, these being near communities, areas of high timber volume, young growth of potential value and along the main travel routes. The degree of protection, however, varies from year to year, depending on hazard conditions and the availability of manpower and equipment.

Fire suppression is also often considered warranted on both non-productive forest land and non-forested land in the interests of protection of wildlife and the continuity of trapping, which is still important to a segment of the indigenous population. Protection priorities are regularly assessed and changed when necessary.

Beginning in the 1950's the two Services established a number of public campgrounds in the Territories, with the object of concentrating campers in a few locations and thereby reducing fire risk. Choice of site now depends on each location's scenic attractiveness rather than its fire prevention potential. These campgrounds — at present there are 25 roadside stopping places in the Northwest Territories and 43 in the Yukon Territory — are attracting an increasing number of tourists each year.

In the past the Forest Services have been responsible for the development and maintenance of campground facilities but these responsibilities are now being transferred to the Territorial Governments. Construction and maintenance costs of the campgrounds are shared by the Federal Government and Territorial Governments.

5-3.1.1 – Regulations

The forests of the Yukon Territory and the Mackenzie District are a Federal responsibility. They are administered under the Federal Territorial Lands Act and by the Territorial Timber Regulations issued under authority of the Act. The Act and Regulations bear

5-3.1.1

out the basic policy of the Federal Government with respect to the northern forests; that is, the encouragement of the best possible utilization of the resource and the assurance of a reasonable return in the form of royalties, stumpage and rentals.

The Territorial Timber Regulations govern the cutting and removal of timber on Territorial lands in the Yukon and Northwest Territories and cover the issuing of permits, the seizures of timber products, the general requirements for forestry operators and the dues payable to the Federal Government for timber cut.

Legislation for forest protection is handled by each Territory through its own Forest Protection Ordinance, formulated and passed by the councils of the Yukon and Northwest Territories. Traditionally, the councils have made forest protection their own legislative responsibility, even though the Territorial forests are administered by the Federal Government.

The Yukon Forest Protection Ordinance and the Northwest Territories Forest Protection Ordinance are similar in content and are concerned with such areas as the appointment, powers and duties of forestry officers, regulations, general protection and prohibitions, closed seasons and assistance in fire fighting. The ordinances provide for the establishment of a closed season each year, normally from May 1 to September 31, during which fires may not be lit without first obtaining a permit.

For further information write:

Administrator of Northern Forests,
Northern Economic Development Branch,
Department of Indian Affairs
and Northern Development,
400 Laurier Avenue,
Ottawa, Ontario.

Superintendent,
Yukon Forest Service,
Whitehorse, Y.T.

Superintendent,
Mackenzie Forest Service,
Fort Smith, N.W.T.

MAP No. 5-1

MAP NO. 5-1





MAP No. 5-2

MAP NO. 5-2



MAP No. 5-3

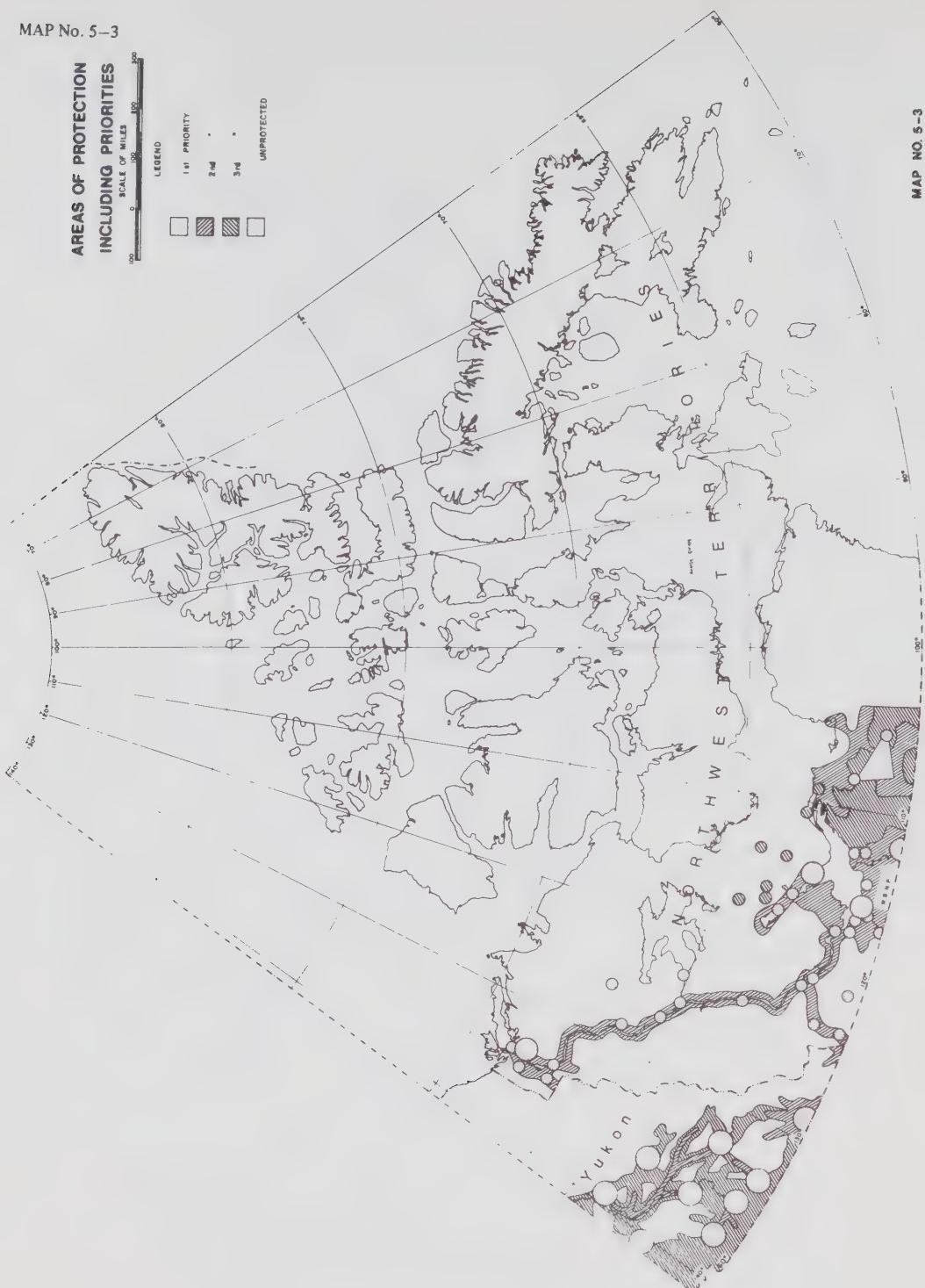
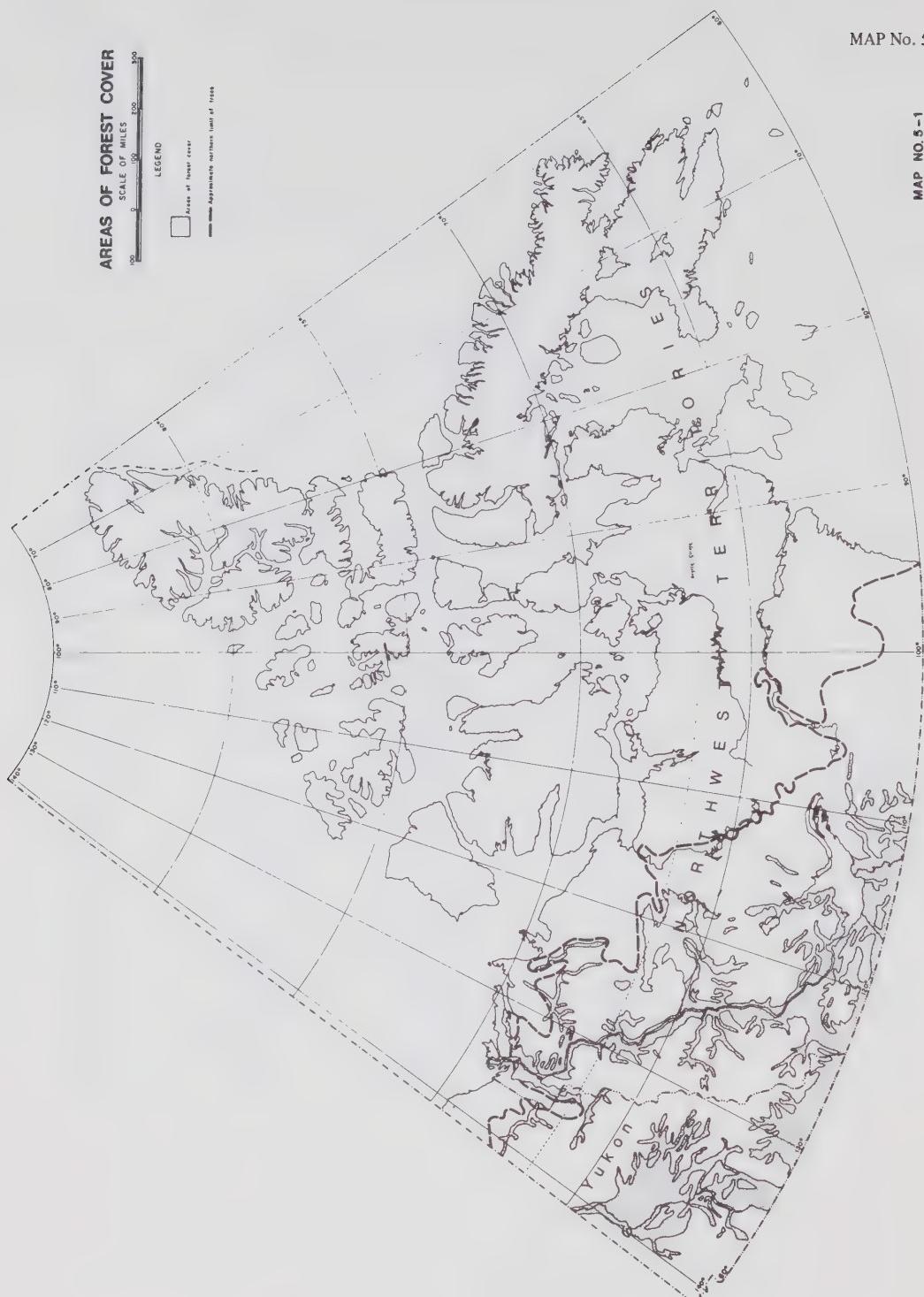


TABLE 5-1
WOOD UTILIZATION IN THE
YUKON AND NORTHWEST TERRITORIES
1961 - 1970

Fiscal Year	Territory	Lumber (fbm)	Round Timber (lineal feet)	Fuelwood (cords)
1961-62	N.W.T.	1,049,000	584,000	1,410
	Y.T.	4,037,842	918,987	6,249
1962-63	N.W.T.	2,060,055	17,000	3,741
	Y.T.	8,096,274	2,103,375	6,892
1963-64	N.W.T.	2,271,533	50,134	3,944
	Y.T.	8,999,037	2,723,456	5,902
1964-65	N.W.T.	1,358,295	184,275	2,501
	Y.T.	6,557,695	2,308,751	8,677
1965-66	N.W.T.	2,522,947	251,268	8,645
	Y.T.	2,654,054	1,197,300	6,798
1966-67	N.W.T.	3,501,600	427,130	8,295
	Y.T.	5,213,882	1,626,296	8,411
1967-68	N.W.T.	2,365,877	436,575	8,434
	Y.T.	7,049,647	427,486	8,545
1968-69	N.W.T.	2,736,062	128,555	1,023
	Y.T.	7,680,707	1,150,690	10,080
1969-70	N.W.T.	5,089,776	295,670	1,457
	Y.T.	12,058,470	650,583	6,084

MAP No. 5-1

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northern economic
development branch
department of indian affairs
and northern development
government of canada

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6-1 Natural Vegetation

LAND

6-1.1 – GENERAL LAND USE MANAGEMENT

“Land use” as applied in this section refers to land conservation and protection.

Due to the accelerated rate of exploration and development activity in the northlands and the adverse effects this activity can have upon the northern ecosystem it has become necessary to apply some measures of control over these activities in order to minimize surface disturbances, and also to provide liaison between northern residents, particularly Eskimos and Indians, and industrial organizations engaged in resource development activities in the North.

Consideration is given to human and social needs as well as economic development requirements.

6-2.1 – ADMINISTRATION

The Land Use Management Section is organized under the Water Lands and Forests Division, Northern Economic Development Branch, Department of Indian Affairs and Northern Development. Application for a permit to carry out a land use operation can be obtained from the Regional offices situated at Yellowknife and Whitehorse. Permits are also issued from these Regional offices.

6-3.1 – REGULATIONS

6-3.1.1 – Northern Land Use Regulations

The Northern Land Use Regulations have been promulgated under authority of amendments to the Territorial Lands Act passed during the 1970 session of Parliament. These regulations set out and provide authority for the enforcement of rules and procedures to be followed by all individuals and companies carrying out operations on Territorial lands. The regulations are designed to prevent needless damage to the northern environment and to protect the unique physical characteristics and the fragile ecological balance of the region.

The regulations are divided into three parts. Part I sets out regulations pertaining to land use which apply throughout the Yukon Territory and the Northwest Territories. Part II sets out regulations that, in addition to the general regulations will apply within Land Management Zones. These Land Management Zones will be areas designated by the Governor-in-Council under authority of the amended Territorial Lands Act and will cover areas of special environmental sensitivity and concern. Within a Land Management Zone, and only in these areas, all operators will be required to obtain a land use permit prior to commencement of land use activities on public lands.

Part III of the regulations deals with the powers of officials administering the regulations, penalties, appeals and procedures.

The Land Use Regulations are designed to set ground rules to exploration and development activities on northern lands, but in no way prohibit or exclude such undertakings.

6-4.1 – RESEARCH

6-4.1.1 Arctic Land Use Research

The Arctic Land Use Research (ALUR) program has been established by the Department of Indian Affairs and Northern Development to detect and define environmental problems affecting land use and to devise and test alternative land use operational procedures.

The program, commenced in 1970, has begun a series of mission oriented scientific projects such as to determine the effects of different types of tracks of vehicles employed in the Arctic, the effects of oil spills on tundra vegetation, plant regeneration on seismic line disturbances, mine waste containment as well as a number of environmental surveys to establish base line data. Results obtained from these projects are made available to interested members of the public, agencies, universities and researchers. These results are also used by the department to determine the type and degree of restrictions that will be applied under the Land Use Regulations to achieve the minimum degradation of the natural landscape during resource exploration and development.

Research projects commissioned through the ALUR program are usually conducted by senior university researchers and in a number of instances are joint cooperative projects with industry. Well over \$500,000 will be spent in 1971-72 to conduct research projects on environmental problems in both the Yukon and Northwest Territories. Land Use Research establishments have been centred at Watson Lake, Y.T., Yellowknife, N.W.T. and Tununuk, N.W.T. to provide scientific instrumentation support to the projects.

It is envisaged that the ALUR program will contribute a strong scientific support to the land use regulations as well as making a significant contribution to the scientific knowledge of the Arctic.

he may apply to have the land surveyed and to purchase it. The prices at which these types of land are sold vary according to the location of the land with respect to the nearest settlement, highway, lake or river, airport etc.

Where warranted, industrial parks have been established, such as those at Pine Point and Hay River.

Lands for sport fishing camps and similar tourist establishments are normally leased for an initial term of five years, including the main camps or lodge sites and the outpost camps operated in conjunction with the main establishment. In all cases the granting of building permits and business licences by the Territorial Governments are pre-requisites to the issue of leases or subsequent renewals.

6-2.1 – AGRICULTURAL LANDS

Because of the extremes in climate and high costs of transportation to and from the Territories farming is expensive, and obtaining loan capital at reasonable rates of interest is difficult. As a result, homesteads are not authorized North of 60. However, if a person wishes to undertake full-time farming and has the financial resources to see him through the initial years before a return on the land can be realized, he may apply for land up to 160 arable acres within an area designated by the Department of Agriculture as being suitable for farming. Initial occupation is under a lease issued for a five-year term with the lessee being required to construct a house and to place a stated acreage under cultivation before the lease expires. The lease will contain an option to purchase at prices determined at the time of application when the land is inspected. Prices are based on the following minimum figures:

Class 1: Land open or easily cleared	— \$5.00 per acre
Class 2: Land requiring moderate clearing	— \$3.00 per acre
Class 3: Land not included in classes 1 or 2	— \$1.00 per acre

When the improvements specified in the lease have been completed, the lessee may apply to have the land surveyed and subsequently purchase it.

6-2.1.1 – The Yukon Territory

Agriculture in the Yukon goes back to the days of the Klondike Gold Rush of the 1890's, but no significant expansion has ever taken place. In addition to the limiting factors of weather and soil, the region, at present, is too remote from major urban markets and sources of supply to warrant volume production. Transportation costs are a significant obstacle in obtaining agricultural needs and shipping produce. In addition, the Territory lacks the necessary local markets which could support specialty products.

Yukon agricultural soils occur only in intermittent pockets and narrow bands along main rivers and their tributaries. To assess the amount of land suitable for agriculture a number of field studies have been completed by the Department of Agriculture.

The following areas, are considered potentially suitable for agricultural use:

*Takhini and Dezadeash Valleys	— 205,500 acres
*Yukon River and Tributaries	— 60,000 acres
*Tagish and Little Atlin areas	— 8,000 acres
*Dawson area	— 6,000 acres

Most of this land is forest covered. In addition, the frost free period is short and often there is insufficient moisture for rapid growth. This is offset, in part, by the extended periods of light which accelerates normal growth. Most of the soils in the Yukon are rather acid and natural fertility falls off rapidly. Despite such difficulties experience has shown that early varieties of grain and potatoes can be successfully grown in some places.

There is some small scale truck gardening and mixed farming, particularly in the vicinity of Whitehorse, but, the raising of beef cattle is the main agricultural activity (most beef raised is consumed locally). Lands for market gardening are usually within a reasonable distance of a settlement and are required in relatively small parcels of 20 acres or less. As with all other lands occupation is, in the first place, authorized by an agreement for sale or a five-year lease with the usual requirements with respect to construction of a dwelling and the cultivation of

a stated acreage within the five years. In the case of grazing lands, the land is not sold except for a parcel of up to 160 acres for the home site, ranch buildings and production of winter feed. The occupation of the actual grazing land is by lease only.

The 1961 Census showed that there were 33 separate parcels of land held in the Yukon for agricultural or grazing use under lease or agreement of sale. The total area involved was 10,300 acres. In addition, applications for another 33 parcels containing 10,600 acres were pending. The census listed 15 farms and reported the value of products sold at \$15,600. About 12% of the farmland was classed as improved. By 1965 the area held for agricultural or grazing purposes by lease or agreement for sale had risen to 27,700 acres with applications for a further 3,000 acres pending. Most of the existing and pending agreements were for grazing only. At the end of September 1968 there were 30 leases for agricultural purposes involving a total of 2,009 acres and 65 grazing leases comprising 32,430 acres in force.

To assist in the development of agriculture in the Yukon the Canada Department of Agriculture has operated an experimental farm at Haines Junction, Mile 1019 on the Alaska Highway since 1944. This farm has about 200 acres under cultivation and has a staff of about 15 persons.

6-2.1.2 Northwest Territories

There are between 3,500,000 and 4,000,000 acres of arable land in the Northwest Territories. As in the Yukon, although the season is short, growth is assisted by the long summer days. Growth is further helped by the fact that perma-frost aids in holding the available moisture in the ground.

Wheat and coarse grains give good yields and root vegetables, tomatoes, berries and tree fruits are grown successfully on a small scale. The Canada Department of Agriculture operates an experimental station at Fort Simpson on the Mackenzie River.

The soils with agricultural potential are located in the District of Mackenzie. Soils in the Districts of Keewatin and Franklin are not suitable for agricultural use. As in the Yukon, the suitable soils are located mainly along river valleys. The major areas of potential use are along the Slave, Hay, Liard and Mackenzie Rivers.

The largest arable section of the Northwest Territories contains about 2,000,000 acres and is located along the Slave River, north of Fort Smith. The ratings of the soils in this area are as follows:

Rating	Area of Arability Classes	
	Acres	Percent
Class 1 (arable—no limitation)	397,300	18.3
Class 2 (moderate limitation)	1,182,400	54.3
Class 3 (requires intensive management)	116,300	5.4
Class 4 (non arable)	356,000	16.2
Lakes and Rivers	127,000	5.8
TOTAL	2,179,000	100.0

6-2.1.2

The lowlands adjacent to the Liard River are an extension of the more southerly Peace River Block and are considered to have a high potential. The soil ratings for this area are as follows:

Rating		Area of Arability Classes Acres	Percent
Class 1	(arable—no limitation)	nil	
Class 2	(moderate limitation)	75,900	5.6
Class 3	(requires intensive management)	378,500	28.1
Class 4	(non arable)	311,500	23.0
Class 5	(limited capability)	341,400	25.3
Other		243,400	18.0
	TOTAL	1,350,800	100.0

The potentially arable area on the Mackenzie River is estimated to contain approximately 1 million acres of agricultural land but no detailed classification is available for this area or for the potentially arable lands along the Hay River and along the shores of Great Slave Lake.

According to 1961 Census there were a total of 11 farms in the Northwest Territories with an overall acreage of 518 acres, of which 134 acres were classified as improved land. Twenty three people were involved either full or part time in agriculture and the total value of products sold in 1961 was \$13,000.

6-5.1 – GENERAL

The Yukon and Northwest Territories are not agricultural areas. A number of factors are involved, such as the limitation of crop growth by short growing or frost-free seasons, unsuitability of most of the land area for cultivation and high transportation costs.

Consequently, farming on a successful full-time basis has limited possibilities, both from the technical and economic point of view. Although there are some potential agricultural areas in the region, attempts at farming will be confined for a long time to specialized and marginal operations.

Despite these land utilization problems, land use has accelerated in recent years. For example, there were 577 land leases and agreements of sale in force at March 31, 1953, compared to 1,384 at March 31, 1970, with many of the earlier sale transactions being completed in the intervening years.

The best growth potentials are to be found in those activities which are dependent on land, such as industrial and urban expansion, outdoor recreation, trapping, hunting and fishing. (See map 6-1).

6-5.1.1 – Administration

Jurisdiction over vacant lands in the Yukon and Northwest Territories is exercised by the Federal Government and the appropriate Territorial Government. All Crown lands under the control and management of the Minister of Indian Affairs and Northern Development are administered pursuant to the Territorial Lands Act and the Territorial Lands Regulations.

An extensive administrative organization has been established by the Department to implement the Act and Regulations. Land Offices are located at Watson Lake, Whitehorse, Mayo and Dawson in the Yukon Territory, and at Fort Smith, Hay River, Pine Point, Yellowknife, Fort Simpson and Inuvik in the Northwest Territories.

Area administrators in many of the smaller settlements and townsites will also accept applications to lease or purchase lands.

To improve the service to those interested in land use, in the Yukon the administration of leases and agreements for sale has been transferred from Ottawa to Whitehorse. A similar decentralization to Yellowknife for the administration of leases and sale agreements in the Northwest Territories is scheduled for 1971.

Administration of all Crown-owned lands in and immediately surrounding the established communities is being transferred to the Territorial Governments under a 5-year program. These "Territorial" lands are administered by the Commissioner of the Yukon Territory or the Northwest Territories, as appropriate, pursuant to the Yukon Territorial Lands Ordinance or the Northwest Territories Commissioner's Land Ordinance.

6-5.1.2 – Land Disposal Policy

Vacant land North of 60 is available to any person over 19 years of age and to any corporation for any legitimate purpose. The basic aim of the land policy is to make land available when and where it is required, consistent with the protection of the public interest.

6–5.1.2

One of the main principles of land policy is that initial occupation must be authorized by a lease or an agreement for sale. Only in extenuating and unusual circumstances will consideration be given to granting title until specified improvements have been made.

In most cases this involves the construction of buildings or other structures directly related to the indicated land use.

An agreement for sale is issued for a term of five years and leases may be granted for any period up to 30 years.

Appropriate stipulations are inserted in the leases and sale agreements as required, to protect the environment against pollution and other ecological hazards.

Other aspects of land policy:

The area of any parcel leased or sold shall not exceed what is reasonable for the purposes for which the land is to be used.

Title to the land may not be issued until the land has been surveyed and the plan registered. Cost of the survey must be paid by the purchaser.

Land within 100 feet of the high water mark of a body of water may be leased but cannot be sold.

Under normal circumstances, a lessee, upon expiration of his lease may obtain a renewal, or if a renewal cannot be granted or is not required, he may remove his improvements from the land and is given a stated time in which to do this.

Under an agreement for sale the purchaser may pay for land in five equal annual installments and provided the terms and conditions of the agreement have been met may then obtain title.

Any person desiring to acquire land must select the parcel of land he desires. Agents in the land offices are always willing to assist the applicant in this task.

No lease or agreement for sale of land includes mines and minerals including oil and gas, merchantable lumber or the bed of any lake or stream.

The sale and leasing of Crown lands, other than lands suitable for grazing or muskrat farming, are limited to 160 acres and 640 acres respectively to any one person unless otherwise approved by the Governor in Council.

Not more than 6,400 acres of lands suitable for grazing or muskrat farming may be leased to any one person without the approval of the Governor in Council.

Lands suitable for muskrat farming may not be sold.

The annual rent payable under all leases is set at not less than 10% of the appraised value of the land or \$25.00, whichever is greater.

6–5.1.3 – Residential, Commercial and Industrial Lands

Land for residential, commercial or industrial use may be occupied under a lease or an agreement for sale. The occupant is given two years in which to complete a house or other improvements to the land. When the required improvements have been completed he may apply to have the land surveyed and to purchase it. The prices at which these types of land are sold vary according to the location of the land with respect to the nearest settlement, highway, lake or river, airport, etc.

Where warranted, industrial parks have been established, such as those at Whitehorse, Y.T., and Pine Point, Hay River, Inuvik, Fort Simpson and Yellowknife, in the N.W.T.

Lands for sport fishing camps and similar tourist establishments are normally leased for an initial term of five years, including the main camps or lodge sites and the outpost camps operated in conjunction with the main establishment. In all cases the granting of building permits and business licences by the Territorial Governments are prerequisites to the issue of leases or subsequent renewals.

6-6.1 – AGRICULTURAL LANDS

Because of the extremes in climate and high costs of transportation to and from the Territories farming is expensive, and obtaining loan capital at reasonable rates of interest is difficult. As a result, homesteads are not authorized North of 60. However, if a person wishes to undertake full-time farming and has the financial resources to see him through the initial years before a return on the land can be realized, he may apply for land up to 160 arable acres within an area designated by the Department of Agriculture as being suitable for farming. Initial occupation is under a lease issued for a five-year term with the lessee being required to construct a house and to place a stated acreage under cultivation before the lease expires. The lease may contain an option to purchase at prices determined at the time of application when the land is inspected. Prices are based on the following minimum figures:

Class 1: Land open or easily cleared	\$5.00 per acre
Class 2: Land requiring moderate clearing	\$3.00 per acre
Class 3: Land not included in classes 1 or 2	\$1.00 per acre

When the improvements specified in the lease have been completed, the lessee may apply to have the land surveyed and subsequently purchase it.

6-6.1.1 – The Yukon Territory

Agriculture in the Yukon goes back to the days of the Klondike Gold Rush of the 1890's, but no significant expansion has ever taken place. In addition to the limiting factors of weather and soil, the region, at present, is too remote from major urban markets and sources of supply to warrant volume production. Transportation costs are a significant obstacle in obtaining agricultural needs and shipping produce. In addition, the Territory lacks the necessary local markets which could support specialty products.

Yukon agricultural soils occur only in intermittent pockets and narrow bands along main rivers and their tributaries. To assess the amount of land suitable for agriculture a number of field studies have been completed by the Department of Agriculture.

The following areas are considered potentially suitable for agricultural use:

Takhini and Dezadeash Valleys	205,500 acres
Yukon River and Tributaries	60,000 acres
Tagish and Little Atlin areas	8,000 acres
Dawson area	6,000 acres

Most of this land is forest covered. In addition, the frost-free period is short and often there is insufficient moisture for rapid growth. This is offset, in part, by the extended periods of light which accelerates normal growth. Most of the soils in the Yukon are rather acid and natural fertility falls off rapidly. Despite such difficulties experience has shown that early varieties of grain and potatoes can be successfully grown in some places.

There is some small-scale truck gardening and mixed farming, particularly in the vicinity of Whitehorse, but, the raising of beef cattle is the main agricultural activity (most beef raised is consumed locally). Lands for market gardening are usually within a reasonable distance of a settlement and are required in relatively small parcels of 20 acres or less. As with all other lands occupation is, in the first place, authorized by an agreement for sale or a five-year lease with the usual requirements with respect to construction of a dwelling and the cultivation of a stated acreage within the five years. In the case of grazing lands, the land is not sold except for a parcel of up to 160 acres for the home site, ranch buildings and production of winter feed. The occupation of the actual grazing land is by lease only.

The 1961 Census showed that there were 33 separate parcels of land held in the Yukon for agricultural or grazing use under lease or agreement of sale. The total area involved was 10,300 acres. In addition, applications for another 33 parcels containing 10,600 acres were pending. The census listed 15 farms and reported the value of products sold at \$15,600. About 12% of the farmland was classed as improved. By 1965 the area held for agricultural or grazing purposes by lease or agreement for sale had risen to 27,700 acres with applications for a further 3,000 acres pending. Most of the existing and pending agreements were for grazing only. At the end of March 1970 there were 55 leases for agricultural purposes involving approximately 2,500 acres, and 76 grazing leases comprising some 35,000 acres in force. Twenty-six of the agricultural sites were also used for residential purposes.

To assist in the development of agriculture in the Yukon the Canada Department of Agriculture operated an experimental farm at Haines Junction, Mile 1019 on the Alaska Highway from 1944 to March 31, 1970, when their research program was completed. Information on the results of the research studies is available from the Information Division of the Department of Agriculture at Ottawa.

6-6.1.2 – Northwest Territories

There are between 3,500,000 and 4,000,000 acres of arable land in the Northwest Territories. As in the Yukon, although the season is short, growth is assisted by the long summer days. Growth is further helped by the fact that permafrost aids in holding the available moisture in the ground.

Wheat and coarse grains give good yields and root vegetables, tomatoes, berries and tree fruits are grown successfully on a small scale. The Canada Department of Agriculture operated an experimental station at Fort Simpson on the Mackenzie River until March 31, 1970, when their research program was completed. Details of their studies are available from the Information Division of the Department of Agriculture at Ottawa.

The soils with agricultural potential are located in the District of Mackenzie. Soils in the Districts of Keewatin and Franklin are not suitable for agricultural use. As in the Yukon, the suitable soils are located mainly along river valleys. The major areas of potential use are along the Slave, Hay, Liard and Mackenzie Rivers.

The largest arable section of the Northwest Territories contains about 2,000,000 acres and is located along the Slave River, north of Fort Smith. The ratings of the soils in this area are as follows:

Rating	Area of Arability Acres	Classes Percent
Class 1 (arable-no limitation)	397,300	18.3
Class 2 (moderate limitation)	1,182,400	54.3
Class 3 (requires intensive management)	116,300	5.4
Class 4 (non arable)	356,000	16.2
Lakes and Rivers	127,000	5.8
Total	2,179,000	100.0

6-6.1.2

The lowlands adjacent to the Liard River are an extension of the more southerly Peace River Block and are considered to have a high potential. The soil ratings for this area are as follows:

Rating	Area of Arability	Classes
	Acres	Percent
Class 1 (arable-no limitation)	nil	
Class 2 (moderate limitation)	75,900	5.6
Class 3 (requires intensive management)	378,500	28.1
Class 4 (non arable)	311,500	23.0
Class 5 (limited capability)	341,400	25.3
Other	243,400	18.0
Total	1,350,800	100.0

The potentially arable area on the Mackenzie River is estimated to contain approximately one million acres of agricultural land but no detailed classification is available for this area or for the potentially arable lands along the Hay River and along the shores of Great Slave Lake.

According to 1961 Census there was a total of 11 farms in the Northwest Territories with an overall acreage of 518 acres, of which 134 acres were classified as improved land. Twenty-three people were involved either full or part-time in agriculture and the total value of products sold in 1961 was \$13,000.

MAP No. 6-1



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TOURISM AND RECREATION

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Map

7-1 Existing Tourist and Recreational Facilities

TOURISM AND RECREATION NORTH OF 60

7-1.1 - GENERAL

Canada North of 60 is one of the world's last frontier regions, and therefore offers unique opportunities for both the investor and visitor. The Yukon and Northwest Territories offer a breathtaking range of scenery, from the towering mountains of the Yukon, to the broad sweep of the Mackenzie River valley, the rolling tundra and lake country of the Keewatin District and the glaciers of the Arctic Archipelago.

Within this varying land is an abundance of wildlife — the polar bear, caribou, muskox, seal and beluga whale. Sports fishing on the myriad of lakes is a major attraction.

The Eskimo and Indians, who make up more than half the 40,000 population of the Territories, are among the most colorful people in the world. Eskimo art, discovered and developed only in recent years, has had world-wide acclaim.

The growing search by North Americans for untouched wilderness, free of daily urban tensions and problems, combined with their mobility, has brought the Territories within comparatively easy reach. Consequently, the tourist industry is increasing at a tremendous rate.

The demand for better accommodation and more recreation facilities in the two Territories today provides many opportunities for potential investors. In the past the normal tourist season North of 60 lasted from June to August. However, the interest in the region has grown so rapidly that the season now runs from May to October.

With the expanded season, tourist facilities in both Territories are hard-pressed to keep up to the demand. During the peak of the summer season accommodation in the major centres is inevitably completely booked. In addition, the tourist service industry, such as restaurants and service stations, are overtaxed and must be expanded to meet tourist demand and business travel.

The Federal Government has recently moved to meet this problem by establishing a \$5,000,000 small business loan fund, to assist entrepreneurs in both Territories in establishing and expanding such service industries as motels, hotels, restaurants and stores. It is the intention to make available initially \$300,000 in each of the Territories each year for small loan purposes. This amount is expected to increase as the program expands.

Further information on the Small Business Loan Funds may be obtained from:

Director,
Territorial Relations Branch,
Department of Indian Affairs and Northern Development,
400 Laurier Avenue W.,
Ottawa 4, Ontario.

7-2.1 – YUKON TERRITORY

Tourism is now the Yukon Territory's second largest industry, having grown from less than \$2,000,000 in 1962 to more than \$7,500,000 in 1968.

A study of the Yukon economy, commissioned by the Department of Indian Affairs and Northern Development* indicates the significance of the industry's economic potential. Although still seasonal, it acts as a balancing element in an economy dominated by the volatile and uneven growth of the Territorial mining industry.

The industry itself has been making a steadily increasing contribution to the economic growth of the Territory, and, as North Americans move greater distances to seek wilderness recreation the Yukon is proving to be particularly attractive to an increasing number of families who have the leisure and income to enjoy it.

The Yukon offers magnificent natural attractions to the tourist:

- the altitude and dryness of the air which seem to add a stimulant to the Yukon atmosphere.
- the great rings of mountains that surround the central plateau.
- the rugged hills within the central plateau.
- the majesty of the Yukon River and its tributaries.
- the calm beauty of the great lakes reflecting the hills behind.
- the wide forested valleys.
- the abundant wildlife.

The economic study indicated that 80 per cent of the tourists visiting the Yukon are from the United States, with California, Washington, Alaska and Michigan the largest contributors.

Between May and September, 1968, a total of 118142 visitors cleared Canadian customs, en route to the Yukon, an increase of 18 per cent over the same period in 1967.

The average length of stay has increased from 4.7 days in 1962 to 7.2 days in 1966. Approximately 75 per cent of the tourist visitors come to the Yukon by private car, 15 per cent by air and 10 per cent by bus. Bus package tours have become an increasingly popular way of seeing the Yukon.

Improved transportation routes are stimulating increased interest by wilderness seekers, particularly the new "marine highway". This route utilizes the British Columbia ferry system, roads on Vancouver Island, the Alaska State ferry system and the ports of Haines and Skagway, Alaska, from which highway access to the Yukon is available. Travellers on the marine highway may then return to southern Canada and the United States over the Alaska Highway.

Some approximate road distances to Whitehorse, YT. from:

New York	4100 miles
San Francisco	2700 miles

*The Yukon Economy D.W. Carr and Associates Ltd., Ottawa, Nov. 1968,
Available from Queen's Printer.

Seattle	1800 miles
Vancouver	1700 miles
Edmonton	1287 miles

A new 370-mile highway running between Watson Lake, Ross River and Carmacks offers a second route to Dawson, a mecca for tourists seeking relics of the spectacular Klondike gold rush days of the 1890s, and to Alaska. As traffic volume increases on this highway the demand for tourist services is bound to provide new opportunities for investors.

A network of 36 government campgrounds provides basic facilities for campers. The growing demand for sewer, water and hydro connections has encouraged construction of trailer parks by private operators in some areas.

At the present time there are 82 establishments providing a total of 1,364 sleeping units, with a capacity of approximately 4,000 persons throughout the Yukon. A total of 976 units are available in the following communities:

Carcross	22 units
Carmacks	37 units
Dawson	106 units
Haines Jct.	41 units
Keno	15 units
Mayo	36 units
Teslin	41 units
Watson Lake	132 units
Whitehorse	546 units

An additional 71 units are planned for the Territory in 1969.

7-3.1 – NORTHWEST TERRITORIES

The tourist industry potential of the Northwest Territories is impressive. The acceleration of resource development activity, coupled with rapidly increased transportation facilities, and a general interest in the region, have combined to create a favorable climate for investment in the industry.

While still comparatively modest, the volume of tourists arriving in the Territories is growing annually, from 600 in 1959 to 9,000 in the 1968–69 fiscal year. Expenditures have increased from \$350,000 to \$3,100,000 in the same period.

Surveys taken in 1968 revealed that the average party size was 3.78 persons and the average length of stay 7.6 days. Average spending per party-day was \$17.60 (the average Canadian party spent \$14.93, the average United States party \$20.12).

Nine out of every 10 tourists surveyed in 1968 had not been to the Northwest Territories before. Of the visitors, 54 per cent were Canadian, 42 per cent American and 4 per cent foreign. Half the visitors arrived by highway and 40 per cent made direct flights to a Territorial fishing lodge.

Sightseeing, photography, shopping, fishing and visiting museums proved to be the major tourist attractions, in that order.

Extension of the highway system linking the Territories to southern Canada and the United States has made such communities as Yellowknife, Enterprise, Hay River, Fort Smith, Pine Point, Fort Providence and Rae easily accessible by automobile. New extensions to Fort Resolution and Fort Simpson, to be opened in 1969, add to the list of possible tourist destinations.

The network of campgrounds and picnic sites, under the jurisdiction of the Division of Tourism and Outdoor Recreation, is being built up along the highway system. In 1968, 65 per cent of Territorial highway travellers used the campgrounds for overnight accommodation.

Scheduled and charter air service is available to tourists throughout the Territories. Jet service is available between Edmonton, Hay River and Yellowknife, and between Montreal and Frobisher Bay.

To meet the increasing demand of tourists, a Northwest Territories Tourist Office was organized in 1960 to assess tourist potential and promote development of tourist facilities and traffic. This office is now a part of the Territorial Government, under the Division of Tourism and Outdoor Recreation.

Tourist promotion is now carried on actively in Canada and the United States.

The Northwest Territories Tourist Association, representing carriers, operators and others interested in tourism, holds annual conferences to recommend new policies and programs for tourist development in the region.

The attractions of the Northwest Territories are unique and diverse. Big game hunting in the Mackenzie Mountains, opened in 1965, has become one of the major attractions among outdoorsmen, with Dall sheep, grizzly bears, moose and mountain goats

available for trophies. Sea mammal hunting is an increasingly popular experience, available in the eastern Arctic. License fees for seal are \$20.00 non-resident Canadian and \$25.00 for others; and for white whale, \$20.00 non-resident Canadian and \$20.00 for others.

Hunting and fishing in the Keewatin District is unusual and challenging. The season starts with seal hunting during the early part of May and continues over the spring break-up into the fishing season, usually beginning around June 25 and lasting until mid-September.

Hunting for seal on the edge of the ice floes involves travelling to and from the hunting grounds by dog team with an occasional overnight stay at an ice camp offshore in Hudson Bay.

Prolonged daylight during the summer months provides the outdoorsman with opportunity for round-the-clock activity. As the rivers race from the lakes at flood level toward the end of June the Arctic char begin their annual migration to the sea. This is the period when they are more voracious and more attracted to the fisherman's lure. They remain in the sea, congregating around the mouths of rivers until September when they move back upstream to the spawning and wintering grounds in the lakes.

From break-up to freeze-up, grayling and lake trout swarm in the rivers and lakes.

Non-resident angling licenses cost \$2.00.

In 1966, the Department of Indian Affairs and Northern Development established a small tourist camp at Rankin Inlet, to demonstrate the feasibility of tourist development in the area. Subsequently, similar camps were established at Baker Lake and Whale Cove. The camps at Rankin Inlet and Baker Lake are now run by private entrepreneurs.

Yellowknife, capital of the Northwest Territories, boasts the only golf course North of 60, and during July, when the sun never sets 24-hour golfing marathons are a popular sport.

The Great Slave Lake region surrounding Yellowknife is a source of interest to the geologist and rockhound, being rich in Paleozoic fossils and a wide range of rocks and minerals such as beryl, amethyst, garnet, jasper, rose quartz, serpentine and tourmaline.

The Mackenzie River and its tributaries, the Slave, the Nahanni, the Liard and the Peel, provide thousands of miles of navigable water. The Mackenzie, one of the world's largest rivers, has historically been the main water transportation route in the Northwest Territories. Many of the historic settlements of the Territories are scattered along its banks.

The Hudson's Bay Company, which has encouraged tourism in the Territories, from the early days when the firm operated a paddle steamer on the Mackenzie, has kept pace with the times by introducing a U-Paddle canoe rental system North of 60.

For further information write:

Travel Arctic
Yellowknife, NWT.



transport

north
of 60

northern economic
development branch
department of indian affairs
and northern development
government of canada



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TRANSPORT NORTH OF 60

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- 8-2 Air Charter Rates North of 60
- 8-3 Commercial Air Services – Yukon
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Townspeople Services

Water is pumped from the river to a 350,000 gallon storage tank for domestic water and fire protection. Heating comes from power house waste and additional boilers. Fuel oil is stored in a 350,000 gallon steel tank.

Sewers are laid separately in trenches, with the discharge directed into an aerobic treatment plant below the townsite.

Utilidors below ground level carry all steam and water lines. A fire break has been established around the entire townsite area.

Buildings are erected on wooden piles sunk in holes auger-drilled to 21 feet. Frozen material from the excavation in the permafrost is used as backfill around the pile for the bottom 14 feet. Dry sand seven feet in depth is placed on top of the backfill and capped by former material. Seasonal frost in the region penetrates seven feet and the sand allows for ground movement.

Single persons on the mine staff are housed in three two-storey, 40 room bunkhouses, four 10-room aluminum trailers, one 17-room junior and senior men's staff house, and one 11-room ladies' staff house.

Family accommodation includes six furnished trailer units, 31 three-bedroom prefabricated homes, one four-bedroom prefabricated home, and five houses for management.

Company homes are available to married staff personnel. The company assists other employees to acquire their own homes through a liberal mortgage and loan plan.

The townsite also includes a four-room school and activity room, built under government contract at a cost of \$272,000, and a prefabricated medical clinic containing three two-bed wards and an x-ray room, costing \$60,000.

Mining

Waste stripping of argillites and limestone to prepare the open pit was carried out in 1966-67. The ore is mined in 30 foot benches. An estimated 1,500 tons of explosives are used in the pit each year, the largest blast to date producing 100,000 tons of waste.

The current inventory of heavy duty equipment in the operation includes:

- 1 electric 5 cubic yard shovel
- 1 electric 9" diameter rotary drill
- 1 electric 7" rotary drill
- 4 65-ton Letourneau West. Haulpak trucks
- 2 35-ton Letourneau West. Haulpak trucks
- 1 8 cubic yard Hough 400 loader
- 1 2 cubic yard Northwest 80D shovel
- 2 D8 Caterpillar tractors
- Sundry service equipment.

Transportation

The transport division of Cassiar Asbestos operates out of Whitehorse and hauls an average load of 23 tons of fibre over 400 miles of gravel road from the mine. The fibre is containerized and placed aboard White Pass and Yukon Railway cars and transported over narrow gauge rail 110 miles to Skagway for trans-shipment by container ship to Vancouver. Shipments from Skagway are made every two weeks.

A limited amount of fibre is also trucked down the Alaska Highway.

During the spring breakup and fall freezeup a 1,400-foot aerial cableway, capable of carrying 12 tons, is used to ferry freight across the Yukon River at Dawson City. During the winter months the river is crossed on an ice bridge and during the summer, the Territorial Government operates a ferry.

In the fall of 1968, Great Northern Airways included Clinton Creek on its regular schedule operating from the company-built 5,000 foot airstrip.

Personnel

Cassiar Asbestos employs 203 hourly-rated personnel and 60 salaried personnel at Clinton Creek. Of this, 25, including six persons of Indian extraction, are Dawson residents. Some 28 nationalities by birth are represented on the work force, and 50 per cent are Canadian-born.

The annual payroll is \$3,500,000 including fringe benefits.

Costs

Total capital outlay to end 1968	\$26,000,000
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Sample Costs:

Aerial Mapping	\$ 45,000
Soil Testing – ore sampling	25,000
Water Investigation	25,000
Access road from 60 Mile Road	575,000
Other roads in mine, plant and townsite areas	225,000
Construction camp	110,000
40 Mile River bridge	1,200,000
Waste stripping	775,000
Yukon River skyline	220,000
Plant and equipment	1,735,000
Townsite and community services	3,665,000
Automotive and heavy duty equipment	2,000,000

*Recovered from Government participation in access road, 40 Mile River bridge and Yukon River skyline – \$1,081,480

*Value of inventory of operating stores – \$1,000,000

*Daily cost per man for room and board – \$7.00

*Current range of wage rates – \$2.90 – \$4.10 per hour

*Average hours per week per man – 50

*Estimated costs for mining, shipping/selling – \$50 for each ton of fibre produced.

Passenger and freight charges are generally higher North of 60 than in the rest of Canada, even on routes which have a relatively high density of traffic. However, with the introduction of faster and more efficient equipment on many northern routes this gap has been narrowed. It may be some time before the gap is closed completely because the costs of supporting any activity North of 60, including air transport, are determined by a variety of factors, and are usually quite high.

Thus passenger fares and freight rates 20 to 50 per cent higher than southern Canada rates may be expected to continue in the Territories for some time to come.

Charter rates vary widely. In the case of multi-engine aircraft the rates compare favourably with those in southern Canada. Rates for DC-3 and other smaller aircraft are generally higher.

The following table indicates typical charter rates in three main communities in the Yukon and the Northwest Territories. (N.B.: W-Wheels; S-Skis; F-Floats; S/W-Ski/Wheels):

8-2.1 – YUKON TERRITORY

8-2.1.1 – Rail-Water

When the great Klondike gold rush focused world attention on the Yukon in 1898 the horde of fortune seekers came by steamer up the Pacific Coast of British Columbia to the Alaska Panhandle. Standing between them and the golden treasure which they sought were the forbidding Coast Range mountains. The principal routes through these mountains, and the routes which most of the gold seekers followed, were by way of the White and Chilkoot Passes.

The White Pass route remains the principal means of access from tidewater to the Yukon interior today. Since the early 1900s passengers and freight have moved over the 110-mile White Pass and Yukon Route between Whitehorse and Skagway, Alaska, on the Lynn Canal. The narrow gauge railway is one of the most spectacular in the world. During its first 20 miles from Skagway it climbs in a series of twists and turns from sea level to an altitude of about 3,000 feet.

The railway's freight service is linked with a dry cargo and bulk petroleum transport ship which operates between Skagway and Vancouver. Modernization of the rail-water system has taken place and the introduction of container service has resulted in lower freight costs.

In addition to the rail-water operations the White Pass and Yukon also operates two trucking fleets, one within the Yukon and the other on the Alaska highway as well as a pipeline which runs parallel to the railroad. The pipeline has a maximum capacity of 3,000 barrels of petroleum products per day.

The White Pass and Yukon railway also provides passenger service, particularly for the large volume of tourists arriving at Skagway by coastal vessel. During the gold rush, and for several decades thereafter, water transportation was the principal means of transport used by long-distance travellers and freight handlers within the Yukon. Fleets of sternwheelers regularly sailed the Yukon River between Whitehorse, Dawson and Mayo Landing, but during the 1950s motorized road transport moving over the rapidly-growing network of highways replaced the river system, except for small local services.

Further information on the White Pass and Yukon Route may be obtained from:

White Pass & Yukon Corporation
 12th Floor Standard Bldg.
 510 West Hastings Street
 Vancouver 2, B.C.
 Telephone 683-7221
 Telex 045-613

8-2.1.2 – Roads

Construction of the Alaska Highway during World War II gave the Yukon access by road to the rest of Canada, and to Alaska. The highway begins officially at Dawson Creek, B.C., and ends at Fairbanks, Alaska, a distance of 1,523 miles of which 1,220 are in Canada.

The highway crosses the southern part of the Yukon and provides an essential surface link for the vast developing area of the Territory.

8-1.1.3 – Water

Movement of freight by water is a major form of transportation, particularly in the Northwest Territories. The two main water supply systems are:

The Mackenzie River system, originating at Hay River, N.W.T. and McMurray Alta., and Arctic coastal transportation facilities from Tuktoyaktuk, N.W.T.

The sea lift to the eastern Arctic and Arctic Islands undertaken annually by the Department of Transport (see Transport, Northwest Territories, Water)

8-1.1.4 – Air

The airplane, which was instrumental in the opening of the Canadian North in the 1920's and 30's, continues to play a dominant role in resource development. Whereas the early bush pilots relied on slow and inefficient aircraft, the North is now serviced by a variety of aircraft suited to a range of particular purposes. These aircraft vary in size from small bush planes, such as the Cessna 180, to giant freighters, such as the Hercules.

Four commercial airlines now provide regularly scheduled passenger and freight service to the Yukon and the Northwest Territories.

Passenger and freight charges are generally higher North of 60 than in the rest of Canada, even on routes which have a relatively high density of traffic. However, with the introduction of faster and more efficient equipment on many northern routes this gap has been narrowed. It may be some time before the gap is closed completely because the costs of supporting any activity North of 60, including air transport, are determined by a variety of factors, and are usually quite high.

Thus passenger fares and freight rates 20 to 50 per cent higher than southern Canada rates may be expected to continue in the Territories for some time to come.

Charter rates vary widely. In the case of multi-engine aircraft the rates compare favourably with those in southern Canada. Rates for DC-3 and other smaller aircraft are generally higher.

The following table indicates typical charter rates in four main communities in the Yukon and the Northwest Territories. (Note: W—Wheels; S—Skis; F—Floats; S/W—Ski/Wheels).

MAP NO. 8-1



8-2.1 – YUKON TERRITORY

8-2.1.1 – Rail-Water

When the great Klondike gold rush focused world attention on the Yukon in 1898 the horde of fortune seekers came by steamer up the Pacific Coast of British Columbia to the Alaska Panhandle. Standing between them and the golden treasure which they sought were the forbidding Coast Range mountains. The principal routes through these mountains, and the routes which most of the gold seekers followed, were by way of the White and Chilkoot Passes.

The White Pass route remains the principal means of access from tidewater to the Yukon interior today. Since the early 1900's passengers and freight have moved over the 110-mile White Pass and Yukon Route between Whitehorse and Skagway, Alaska, on the Lynn Canal. The narrow gauge railway is one of the most spectacular in the world. During its first 20 miles from Skagway it climbs in a series of twists and turns from sea level to an altitude of about 3,000 feet.

The railway's freight service is linked with a dry cargo and bulk petroleum transport ship which operates between Skagway and Vancouver. Modernization of the rail-water system has taken place and the introduction of container service has resulted in lower freight costs.

In addition to the rail-water operations the White Pass and Yukon also operates two trucking fleets, one within the Yukon and the other on the Alaska highway as well as a pipeline which runs parallel to the railroad. The pipeline has a maximum capacity of 3,000 barrels of petroleum products per day.

The White Pass and Yukon railway also provides passenger service, particularly for the large volume of tourists arriving at Skagway by coastal vessel. During the gold rush, and for several decades thereafter, water transportation was the principal means of transport used by long-distance travellers and freight handlers within the Yukon. Fleets of sternwheelers regularly sailed the Yukon River between Whitehorse, Dawson and Mayo Landing, but during the 1950's motorized road transport moving over the rapidly growing network of highways replaced the river system, except for small local services.

Further information on the White Pass and Yukon Route may be obtained from:

White Pass & Yukon Corporation,
12th Floor Standard Bldg.,
510 West Hastings Street,
Vancouver 2, B.C.
Telephone 683-7221
Telex 045-613

8-2.1.2 – Roads

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The highway crosses the southern part of the Yukon and provides an essential surface link for the vast developing area of the Territory.

Along its length such communities as Fort St. John, Fort Nelson, Watson Lake, Whitehorse and Haines Junction, rely on the highway for transport and communication.

8-2.1.2

The Alaska Highway has not thus far proven an economic route for the transport of most Yukon mineral products.

Another road of importance to the Yukon and also to the State of Alaska is the 160-mile gravel road which joins the Alaska Highway, at Haines, Alaska, on the Lynn Canal. The all-weather road is the only land link between the Alaska Panhandle and mainland Alaska. An excellent ferry system, operated by the State of Alaska, connects Haines with Prince Rupert, B.C., which is the terminus of the highway system linking northern British Columbia and the entire North American continent. The ferry system and the Haines road comprise a popular tourist route which draws many visitors during the summer months, and which can also be used during the winter, although the motorist should be warned that adequate preparation should be taken if a winter trip on the Haines road is contemplated.

In 1965 the Federal Government initiated a new Northern Roads Program which calls for an annual expenditure of \$10,000,000 for ten years. The objective is to establish a network of roads which would serve foreseeable development and communications needs in both the Yukon and the Northwest Territories. The type of road construction varies from rough trails and seasonal roads, both summer and winter, to gravel highways.

One major area development road built by the Federal Government is the new 129-mile, \$9,300,000 Ross River — Carmacks road servicing the new Anvil Mining Corporation lead-zinc mine near Ross River. The road is built to carry up to 90,000 pound loads, compared to most territorial roads which are designed to carry loads up to 75,000 pounds.

In November, 1970, the Federal Government announced a program to speed up construction of the Dempster Highway, through the northern Yukon to Fort McPherson and a connecting link to Arctic Red River and Inuvik in the Northwest Territories.

The Dempster Highway runs northeast from the Dawson area in the Yukon, which is already linked to southern Canada by the Alaska Highway. The new construction will extend the road 240 miles through Fort McPherson and Arctic Red River, and finally Inuvik, in the Mackenzie River delta. A further short leg planned from Inuvik to Tuktoyaktuk would result in the first all-Canadian road leading to the Arctic Ocean. When completed in 1974, the new highway will give Canadians their first road access to the Arctic.

8-2.1.3 – Air

The Yukon Territory is linked to the continental airline system through regularly scheduled passenger and freight services provided by CP Air, from Edmonton and Vancouver. Service between Whitehorse and Fairbanks, Alaska, is provided by Wien Consolidated Airlines. Juneau, the capital of Alaska, and Whitehorse, the Yukon capital, are also connected by regular air services.

The Federal Department of Transport and the Yukon Government operate the major airports in the Yukon. Scheduled and chartered air services are maintained by various companies.

There are 7 licensed and 12 unlicensed airports in the Yukon as well as 5 licensed and 6 unlicensed seaplane bases.

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The Federal Department of Transport and the Yukon government operate the major airports in the Yukon. Scheduled and chartered air services are maintained by various companies.

There are six licensed and 13 unlicensed airports in the Yukon as well as six licensed and five unlicensed seaplane bases.



8-3.1 – NORTHWEST TERRITORIES

8-3.1.1 – Rail

The Mackenzie District of the Northwest Territories is linked by rail to the rest of Canada and the continental rail system by the Great Slave Lake Railway. The 435-mile line was built by the Federal Government at a cost of some \$80,000,000 and began operating in 1964, two years ahead of schedule. Although it has been operating for some years the railway is still under construction and has not, as yet, been designated a common carrier for rate making and operative purposes.

The rail line was constructed primarily to transport ore and concentrates from the Pine Point Mines Ltd. vast lead-zinc operations on the south shore of Great Slave Lake to smelters in Trail, B.C.

In addition, the railway carries considerable freight, such as petroleum products, mine and mill supplies, foodstuffs and general merchandise for Pine Point and the northern Alberta region generally.

On the return trip, trains are also hauling agricultural and forest products from the area.

The rail line has proved a spectacular success. Production at Pine Point has exceeded expectations, and total traffic on the railway has increased substantially from the initial figure of about 8,000 carloads per year.

Along the rail line new farmland has been cleared, communities north of the Peace River are growing rapidly, and oil exploration and development firms operating in the new Rainbow Lake oilfields in northwestern Alberta are making increasing use of the railway facilities.

Additional information on the railway may be obtained from:

Great Slave Lake Railway,
Canadian National Railways,
Edmonton, Alberta.
Phone (403) 429-8110

8-3.1.2 – Water

Water transport, used initially by the first adventurers in the Canadian North, remains a major form of transportation in the Northwest Territories.

The major carrier on the Mackenzie River System and along the Western Arctic Coast is the Northern Transportation Company Limited, a Crown-owned Company, serving a 4,000 mile water system connected by road and rail terminals at Waterways, Alberta, and Hay River, in the Northwest Territories. The Company also maintains distribution agencies at Bushell, Saskatchewan and, in the Northwest Territories at Norman Wells, Inuvik, Bear River and Tuktoyaktuk.

The company operates 27 modern diesel tugs equipped with two-way radios, radar and echo sounders, two coasting vessels and 142 all-steel barges suitable for handling dry or bulk cargo. Barges have a capacity varying from 70 to 1,500 tons.

Present facilities are capable of handling, in one short summer season, up to 450,000 tons of dry and bulk cargo.

8-3.1.2

The shipping season is from early May to late September, depending on area and ice conditions. Receiving warehouses are open in April.

The Northern Transportation Company Limited is now playing a major role in supplying oil exploration teams operating along the Western Arctic Coast, including Alaska, and in the Mackenzie Delta. The Prudhoe Bay area on the North Slopes of Alaska, where a large oil discovery has been made, is receiving part of its supplies by way of this route.

Sample freight rates from Hay River are given below:

Hay River to Prudhoe Bay	\$4.40 per 100 lbs.
Hay River to Inuvik	\$2.00 per 100 lbs.
Hay River to Tuktoyaktuk	\$2.25 per 100 lbs.

Fifth Class rates for General Commodity goods on the Mackenzie System are structured between 4¢ to 5¢ per ton mile for deck cargo and approximately 3½¢ per ton mile for bulk oil, exception being made for certain arbitraries in the Bear River and Great Slave Lake areas.

Distances, in miles, from Hay River to points along the Mackenzie System are as follows:

Fort Good Hope	711
Arctic Red River	925
Fort McPherson	980
Aklavik	1,025
Reindeer Station	1,033
Inuvik	1,042
Tuktoyaktuk	1,122

Acceptance of Freight

All shipments are received subject to the rules and terms of current published tariffs and Shipping Receipt of the Company, which can be seen at the company's offices at 10040-105 Street, Edmonton, Alberta; Hay River, N.W.T. and Waterways, Alberta.

Storage:

Freight is stored free of charge while awaiting shipment, but at the owner's risk for fire, floor or frost damages.

Railway, truck charges:

All railway, truck and other transportation charges must be paid at Hay River, N.W.T. or Waterways, Alberta. Shippers must advise the receiving terminals if shipments are "Prepaid to Destination".

C.O.D. Shipments:

With the exception of refrigerated products the Company will carry C.O.D. shipments provided they are delivered to the Company, all charges prepaid (not including the Company's own charges). The Company must be advised in writing, prior to the receipt of the shipment, the amount of C.O.D.

Bulk Oil Movement:

Space for bulk oil shipments is available on tows leaving Hay River, N.W.T., Norman Wells, N.W.T., and Waterways, Alberta.

Insurance:

Shippers are advised to insure shipments. Cargo insurance may be obtained upon application to the Company.

Packing, Crating:	All cases, crates or containers should be of strong construction, and contents well packed, otherwise cargo will be carried at owner's risk. The shipper will be considered the owner until cargo is delivered to the consignee.
Marking:	Packages should be clearly marked with numbers on the left and weights on the right, and should be individually marked.
Weights:	All weights must be accurate gross weights, and not approximated.
Refrigeration:	Refrigerated service, consisting of three trips per season, is provided along the Mackenzie River from Hay River, N.W.T. to Tuktoyaktuk, N.W.T. for vegetables, fresh fruits and frozen meats. Shippers must reserve space well in advance of sailing dates.

For further details and complete information contact:

Northern Transportation Company Limited,
General Office,
10040 - 105 Street,
Edmonton Alberta.

Telephone: (403) 422-2161

Telex: 037-2480

The Federal Department of Transport is the co-ordinator of freight moving into the eastern Arctic and the Archipelago. Through the Canadian Coast Guard the Department organizes and operates annual sea-lifts.

Dry cargo rates per ton-mile vary according to latitude. Those for destinations lying north of approximately the 70th parallel are higher than rates to more southerly points. For more southerly destinations, such as Carol Harbour, Baker Lake and Repulse Bay, rates tend to be in the vicinity of 3-4 cents per ton mile. For points further north, such as Resolute Bay and Grise Fiord, rates tend to be in the vicinity of 5 cents per ton mile.

For further information write:

Marine Services Division,
Department of Transport,
Hunter Building,
Ottawa, Ontario.

In addition to Northern Transportation Company four licensed private carriers operate on the Mackenzie River. They are as follows:

Kaps Transport Limited, Edmonton, Alta.

Licence CTC (WT-23)

2 Tugs, 6 Barges

Licence to transport goods on the Mackenzie watershed to any point adjacent and/or accessible to, exploration drilling sites, pipeline rights of way, building and construction sites; including the movement of goods off the Mackenzie and up other routes which would be navigable, such as the Liard and other rivers.

8-3.1.2

Licence CTC (WT-29) 2 Tugs, 8 Barges

Licence to transport goods by water from ports and places on the Mackenzie River as defined in the Transport Act, that is, all rivers, streams, lakes and other waters within the watershed of the Mackenzie River.

Streeper Brothers Marine Transport Ltd., Dawson Creek, B.C.

Licence CTC (WT-22) 1 Tug, 3 Barges

Licence to transport goods by water from ports and places on the Fort Nelson and Liard Rivers to ports and places on the Mackenzie and from the Mackenzie River to the Liard and Fort Nelson Rivers.

Licence CTC (WT-28) 1 Tug, 2 Barges

Licence to transport goods by water from ports and places on the Mackenzie and from the Mackenzie River to Liard and Fort Nelson Rivers.

Cooper Barging Services Ltd., Fort Nelson, B.C.

Licence CTC (WT-31) 2 Tugs, 4 Barges

Licence to transport goods by water between all ports and places within the watershed of the Mackenzie River.

Lindberg Transport Limited, Fort Simpson, N.W.T.

Licence CTC (WT-32) 1 Tug, 1 Barge

Licence to provide a weekly barge service to transport goods by water from ports and places on the Mackenzie River watershed between Fort Providence, Northwest Territories and Fort Simpson, Northwest Territories.

8-3.1.3 – Roads

The existing highway system in the Northwest Territories is confined mainly to the southern region, around Great Slave Lake. However, winter roads are becoming an increasingly efficient means of moving supplies into position for the next season's program of exploration and development, and of moving ores and concentrates south to market. For winter roads, the initial cost of opening the road usually varies between \$300 and \$500 per mile, although in some cases they have been much higher in areas of unfavorable terrain. Maintenance costs range from \$200 to \$500 per mile per year. Actual haulage costs vary greatly, depending on traffic and the type of equipment and supplies hauled, and the location of the road.

The Mackenzie Highway, running 600 miles from Grimshaw, Alberta, north to Hay River and Yellowknife, N.W.T., is at present the only highway link between the Northwest Territories and the southern regions of Canada.

A \$10,700,000 extension of the Mackenzie Highway running 95 miles northwest to Fort Simpson, marks the beginning of what may eventually be a permanent highway down the Mackenzie River Valley to the Arctic Coast.

A smaller road system in the Fort Smith area covers approximately 274 miles, including administrative roads in Wood Buffalo National Park.

Trucking rates along the Mackenzie Highway are slightly higher than those in the neighboring province of Alberta.

8-3.1.4 – Air

The Northwest Territories are currently served by three commercial airlines connected to the south.

Pacific Western Airlines flies from Edmonton to Fort Smith, Yellowknife, Inuvik, Cambridge Bay, Norman Wells, Wrigley, Resolution.

Transair operates from Winnipeg to Churchill, Manitoba and points in the Eastern Arctic.

Nordair flies from Montreal to Cape Dyer, Frobisher Bay, Fort Chimo and Resolute Bay.

Charter air carriers, designated by the Air Transport Committee of the Canadian Transport Commission as Class 4 air carriers, operate throughout the Northwest Territories.

8-3.1.4

Group C — Class 4 air carriers who operate one or more aircraft each of which has a maximum authorized take-off weight on wheels not greater than 2,500 pounds.

Explanation of Abbreviations

- 1 Class 1 Scheduled
- 2 Class 2 Regular Specific Point
- 3 Class 3 Irregular Specific Point
- 4A Class 4, Group A, Charter
- 4B Class 4, Group B, Charter
- 4C Class 4, Group C, Charter
- 4AB Class 4, Groups A and B, Charter
- 4ABC Class 4, Groups, A, B and C, Charter
- 4BC Class 4, Groups B and C, Charter
- 8 International Schedule
- 9-3 Class 9-3 International Irregular Specific Point
- 9-4 Class 9-4 International Non-Scheduled Charter

TABLE 8-1

Frobisher Bay, NWT

CARRIER	AIRCRAFT	Rate per mile \$	Rate per hour \$
Nordair Ltd., Hangar No. 6 Montreal Airport Dorval, P.Q.	DC3(W) DC3(S/W)	1.65 1.75	221.15 262.50
Wheeler Northland Airways Ltd., P.O. Box 217, St. Jean, P.Q.	Piper Aztec (W) DHC-3-Otter (W/S/F) Otter (A) Otter (low pressure tires) Dornier DO-28B-1 (W/S/F/)	1.25 1.55 1.75* 2.10 1.75 1.15	220.00 155.00 175.00 210.00 175.00 150.00
Whitehorse, Y.T.			
Canadian Pacific Airlines Ltd., 1281 West Georgia St., Vancouver 5, B.C. Attn: Mr. J.C. Gilmer, Pres.	DC3(W) DC6(W)	1.60 2.50	240.00 623.00
Great Northern Airways Ltd., No. 3 Hangar, McCall Field Calgary 67, Alta.	Cessna 180 (W) Beaver (W/S/F) Beech 18 Piper Super Cub Cessna 180 (F/S)	.55 .50* .65* .80 .95* .90 .45 .50* .60* .55 .50* .65*	65.00 60.00 75.00 80.00 100.00 125.00 40.00 45.00 50.00 65.00 60.00 75.00
Great Northern Airways Ltd., (continued)	PA23-250 (Aztec) Found FBA-2C Otter Cessna 150	.65 .70* .75* .50 .60* 1.20 1.35* 1.50* .30 .40*	120.00 140.00 145.00 50.00 80.00 120.00 135.00 150.00 25.00 35.00

* — Rates vary according to zone.

TABLE 8-1 (continued)
YELLOWKNIFE, NWT

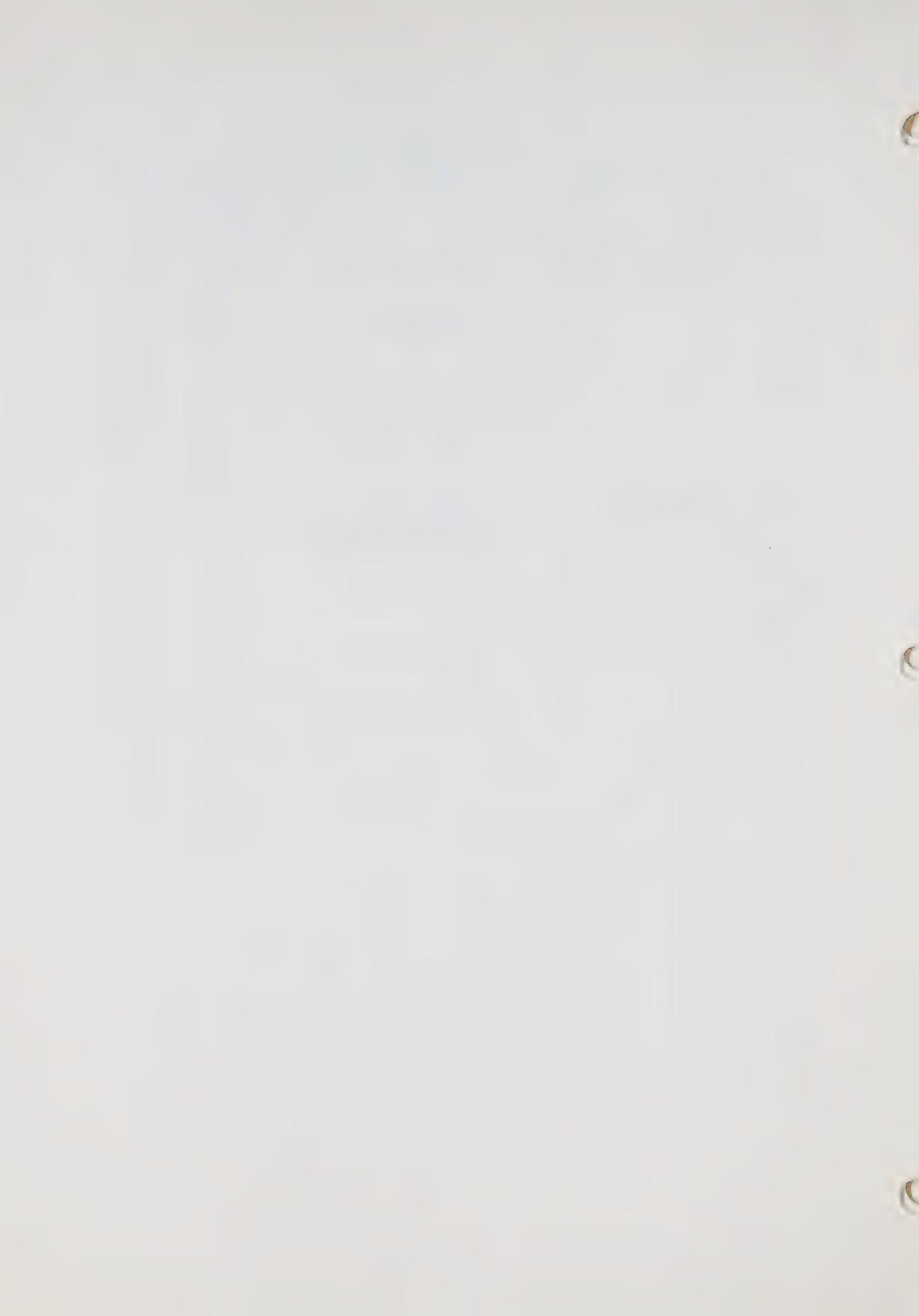
Gateway Aviation Ltd., No. 13 Hangar Industrial Airport Edmonton, Alta.	Cessna 180 (W)	.50	55.00
		.60*	65.00
	Cessna 180 (S/F)	.55	60.00
		.65*	70.00
	Cessna 185 (S/F)	.60	70.00
		.65*	75.00
		.70*	78.00
	Beaver (W/F/S)	.80	80.00
		.90*	90.00
		1.00*	100.00
	Cessna 185 (W)	.50	65.00
		.55*	70.00
		.60*	75.00
	Cessna U206 (W/S/F)	.61	75.00
		.67*	80.00
		.72*	85.00
	Otter (W/S/F/A)	1.20	120.00
		1.35	135.00
		1.50*	150.00
	Beechcraft D18S (W)	.90	140.00
		1.00*	150.00
	Beechcraft D18S (F)	1.05	140.00
		1.20*	160.00
Northwest Territorial Airways Ltd., P.O. Box 100, Yellowknife, N.W.T.	DC3 (W)	1.45	200.00
		1.50*	225.00
	DC3 (W/S)	1.65	225.00
		1.75*	250.00
	Otter (W/S/F)	1.20	120.00
		1.35*	135.00
		1.45*	145.00
	Super Beech 18 (W)	1.00	150.00
		1.10*	160.00
	Super Beech 18 (W/S)	1.20	150.00
		1.30*	160.00
	Super Beech 18 (F)	1.05*	140.00
		1.20*	160.00
	Cessna 180 (W/F/S)	.55	60.00
		.65*	70.00
	PA 23-250 (Aztec)	.65	120.00
		.75*	130.00
	Turbo Beaver	.95	120.00
		1.05*	135.00
		1.15*	150.00

* Rates vary according to zone.

TABLE 8-1 (continued)

Pacific Western Airlines Ltd., Vancouver Airport, B.C.	DC4 (W)	2.00	360.00
Attn: Mr. R.H. Baidman	DC6 (W)	2.40	588.00
Ptarmigan Airways Ltd., Box 66, Yellowknife, NWT	Cessna 180 (W/F/S)	.50	60.00
		.60*	72.00
		.70*	84.00
	Stinson ST9F (F/S)	.65	72.00
		.75*	83.00
		.80*	88.00
	Piper Aztec (W)	.65	120.00
		.75*	130.00
	Cessna 185 (W/SF)	.60	75.00
		.65*	85.00
		.75*	95.00
Sioux Narrows Airways Ltd. Airport Hotel, Winnipeg, Manitoba.	Bruman G-21A (A)	1.00	125.00
	Beechcraft D18 (W/F)	1.00	125.00
	Piper Aztec (W/F)	.75	112.00
Wardair Canada Ltd., 26th Floor, CN Tower, Edmonton, Alta.	Beaver (W/S/F)	.75	75.00
		.80*	80.00
		.90*	90.00
	Otter (W/S.F)	1.20	120.00
		1.35*	135.00
		1.45*	145.00
	Bristol 170	1.88	290.00
	Piper PA 230160 (W)	.45	67.50
		.50*	75.00
		.60*	90.00
	Twin Otter (W/S/F)	1.30	220.00
		1.45*	250.00
		1.60*	275.00

* — Rates vary according to zone



MAP NO. 8-2

AIR TRANSPORTATION ROUTES

SCALE OF MILES

LEGEND

PACIFIC WESTERN

ATLANTIC WESTERN CANADIAN PACIFIC AIRLINES

TRANSAIR

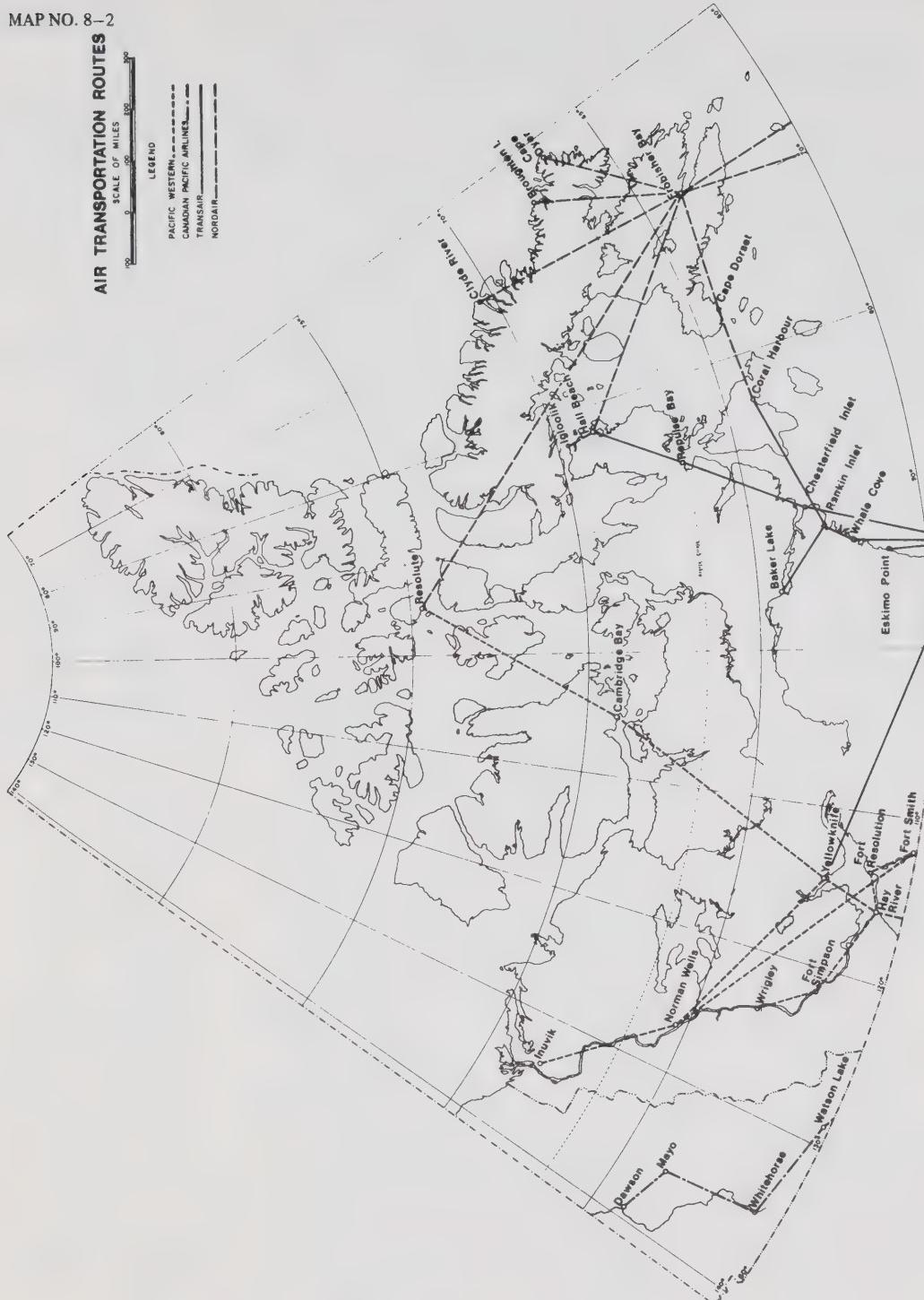


TABLE 8-2
AIR CHARTER RATES NORTH OF 60

Frobisher N.W.T.

Carrier	Aircraft	Rate Per Mile	Rate Per Hour (dollars)
Nordair Ltd.			
Hangar No. 6,	DC3 (W)	1.80	241.20
Montreal Airport	DC3 (S/W)	1.90	255.00
Dorval, P.Q.			
Wheeler Northland Airways Ltd.,	Piper Aztec (W)	1.25	220.00
P.O. Box 217,	DHC-3-Otter (W/S/F)	1.55–1.75	155.00–175.00
St. Jean, P.Q.	Otter (A)	2.10	210.00
	Otter (low pressure tires)	1.75	175.00
	Dornier DO-28B-1 (W/S/F)	1.15	150.00
Whitehorse, Y.T.			
CP Air, 1281 W. Georgia St., Vancouver 5, B.C.	B737 (W)	2.25	1,400.00
Globe Air Services Ltd.	Cessna 172 (W)	.45	55.00
P.O. Box 1125,	Cessna 150 (W)	.30	30.00
Whitehorse, Y.T.	Cessna 185 (W)	.60	80.00
	Cessna 185 (F)	.65	80.00
	Piper Comanche PA24-250 (W)	.55	90.00
	Cessna 180 (W/S/F)	.60–.70	70.00–80.00
	Cessna U206 (W/S)	.65	100.00
Great Northern Airways Ltd., No. 3 Hangar, McCall Field, Calgary 67, Alta.	Beaver (W/S/F)	.90–1.10	95.00–110.00
	PA23-250 Aztec	.70–.75	140.00–145.00
	PA31-Navajo (W)	.80–1.00	165.00–200.00
	Fairchild F27J	1.75	460.00
	Douglas DC3 (W)	1.50–1.60	225.00–240.00
	Douglas DC3 (S)	1.90–2.15	285.00–323.00
	Douglas DC4	2.20	396.00
	Otter	1.30–1.60	140.00–175.00
	Twin Otter (W)	1.50–2.10	250.00–350.00
Tintina Air Services Ltd., 954 Second Ave., Whitehorse, Y.T.	Piper Cherokee 140	.36	40.00
	Piper Cherokee 180	.50–.55	60.00–65.00
	Cessna 180	.60–.70	70.00–80.00
	Cessna 206	.70–.75	105.00–110.00
	Cessna 185	.70–.90	80.00–100.00
	Champion 79C	.35	35.00
Yukon Airways Ltd., P.O. Box 179, Whitehorse, Y.T.	Cessna 185 (W/F/S)	.70–.90	95.00–105.00
	Cessna 320D (W)	.75–.85	150.00–170.00
	Beaver (W/S/F)	.90–1.10	95.00–110.00
	PA23-250 (W)	.70–.75	140.00–150.00
	Cessna 402A (W)	.90–1.00	180.00–200.00
	Britten-Norman Islander (W)	1.00–1.20	140.00–160.00

Rates and availability of aircraft may vary according to season and zone.

Yellowknife, NWT.

Carrier	Aircraft	Rate Per Mile (dollars)	Rate Per Hour
Gateway Aviation Ltd., No. 13 Hangar-Industrial Airport, Edmonton, Alta.	Cessna 150 (W)	.24	24.00
	Cessna 172 (W)	.42	45.00
	Cessna 310 (W)	.70-.75	140.00-150.00
	Cessna 180 (W)	.50-.60	55.00-65.00
	Cessna 180 (S/F)	.55-65	60.00-70.00
	Cessna U206 (S)	.65-80	80.00-95.00
	Cessna U206 (S/F)	.65-.75	78.00-90.00
	Beaver (W/F/S)	.80-1.10	80.00-110.00
	Otter (W/F/S)	1.20-1.50	120.00-150.00
	Twin Otter (W/F/S)	1.40-2.00	240.00-320.00
	Beechcraft D18S (W)	.90-1.00	140.00-150.00
	Beechcraft D18S (F)	1.05-1.20	140.00-160.00
	Twin Beech Bonanza		
	C50 (W)	.60-.65	110.00-120.00
	Douglas	1.50-1.60	225.00-240.00
Koenen's Air Service Ltd., P.O. Box 223, Yellowknife, N.W.T.	Cessna 185 (W/F/S)	.60	75.00
Northward Aviation Ltd., 10350-124 St., Edmonton, Alta.	Beaver	.90-1.10	95.00-110.00
	Beech D18S (W)	.90-1.00	140.00-160.00
	Beech D18S (F)	1.05-1.20	140.00-160.00
	Beech D18S (W/F)	1.05-120	140.00-160.00
	Cessna 402A	.90-1.00	180.00-200.00
	Cessna 206	.65-.75	80.00-90.00
	Helio Courier H250	.55-.85	65.00-100.00
	Dornier DO28	.90-1.20	117.00-156.00
	Otter	1.35-1.60	145.00-175.00
	Twin Otter	1.50-2.10	250.00-350.00
Northwest Territorial Airways Ltd., P.O. Box 100, Yellowknife, N.W.T.	DC-3 (W)	1.65	240.00
	DC-3 (W/S)	1.90	265.00
	Otter (W/S/F)	1.20-1.45	120.00-145.00
	Super Beech 18 (W)	1.00-1.10	150.00-160.00
	Super Beech 18 (W/S)	1.20-1.30	150.00-160.00
	Super Beech 18 (F)	1.20-1.30	150.00-160.00
	Cessna 180 (W/F/S)	.60-.65	60.00-70.00
	PA23-250 Aztec (W)	.75	130.00
Pacific Western Airlines Ltd., Vancouver Airport, B.C.	Boeing 737 (W)	3.10	1400.00
	Boeing 707-138B	4.05	2000.00
	Convair 640 (W)	1.75	420.00
	DC3 (W)	1.50	225.00
	DC4 (W)	2.20	396.00
	DC6	2.65	636.00
	DC6B (W)	2.85	684.00
	Lockheed Hercules		
	L100-20	4.00-4.50	1275.00

Rates and availability of aircraft may vary according to season and zone.

Yellowknife, N.W.T (cont.)

Carrier	Aircraft	Rate Per Mile (dollars)	Rate Per Hour
Ptarmigan Airways Ltd., Box 66, Yellowknife, N.W.T.	Cessna 180 (W/F/S)	.55-.70	60.00-84.00
	Stinson SH9F (F/S)	.75-.90	83.00-99.00
	Piper Aztec (W)	.65-.75	120.00-130.00
	Cessna 185 (W/SF)	.60-.75	75.00-95.00
Sioux Narrows Airways Ltd., Airport Hotel, Winnipeg, Man.	Gruman G-21A (A)	1.00	125.00
	Beechcraft D18 (W/F)	1.35	125.00
	Piper Aztec (W/F)	.75	112.00
	Norseman	1.00	125.00
Wardair Canada Ltd., 26th Floor-CN Tower, Edmonton, Alta.	Otter	1.30-1.60	140.00-175.00
	Bristol 170	2.15-2.30	345.00-370.00
	Piper PA 230-160 (W)	.50-.65	75.00-97.00
	Twin Otter (W/S/F)	1.50-2.10	250.00-350.00
Inuvik, N.W.T.			
Aklavik Flying Service Ltd. P.O. Box 1452, Inuvik, N.W.T.	Cessna 185 (W/S/F)	.55-75	75.00-95.00
	Beech C45W (W)	.80	129.00
Great Northern Airways Ltd., No. 3 Hangar, McCall Field, Calgary 67, Alta.	same as that shown under Whitehorse, Y.T.		
Northward Aviation Ltd., 10350-124 Street, Edmonton, Alta.	same as that shown under Yellowknife, N.W.T.		
Reindeer Air Service Ltd. P.O. Box 1068, Inuvik, N.W.T.	Beech D18S "900" (W)	.90-1.10	145.00-175.00
	Beech D18S "900" (F/S)	1.05-1.20	145.00-175.00
	Beech B50 (W)	.75-.95	175.00-200.00
	Cessna 180"225" (W/F/S)	.55-.65	66.00-80.00
	Cessna 185 "260"	.65-.75	85.00-103.00
	Cessna 185"300" STOL	.70-.80	90.00-110.00
	Cessna 195	.60-.70	72.00-90.00
	Piper Aztec "B" (W)	.70-.80	165.00-195.00
	Piper Super Cub (W)	.50-.60	50.00-60.00
	Twin Navion (W)	.65-.75	130.00-160.00
	DC3- (W)	1.60-1.95	240.00-290.00

Rates and availability of aircraft may vary according to season and zone.

TABLE 8-3
COMMERCIAL AIR SERVICES
YUKON TERRITORY

Point	Carrier	Class of Service
Clinto Creek	Great Northern Airways Ltd., #3 Hangar, McCall Field, Calgary, Alta.	3
Dawson	Great Northern Airways Ltd.	4AB, 9-4, 3, 2
Mayo	Great Northern Airways Ltd. Mayo Helicopters	4B, 2 4(C)
Old Crow	Great Northern Airways Ltd.	3
	Wien Consolidated Airlines Inc. Fairbanks, Alaska	9-3
Ross River	Terr-Air (Territorial Airways) Ltd.	4B
	Yukon Airways Ltd. Box 179, Whitehorse, Y.T.	4BC
Watson Lake	B.C. Yukon Air Service Ltd., Watson Lake, Y.T.	4BC, 9-4
	Canadian Pacific Air Lines Ltd.	1
	Frontier Helicopters Ltd. P.O. Box 10, Watson Lake, Y.T.	4(BC)
	Watson Lake Flying Services Ltd. Watson Lake, Y.T.	4BC
Whitehorse	CP Air Ltd.	1, 2, 4A, 9-4
	Globe Air Services Ltd.	4C
	Great Northern Airways Ltd.	2, 3, 4BC, 9-4
	Kenting Aircraft Ltd.	4(C)
	Tintina Air Services Ltd.	4, 9-4
	Trans-North Turbo Air Ltd. P.O. Box 1103, Whitehorse, Y.T.	4(C) 9-4
	Wien Consolidated Airlines Inc.	8
	Yukon Airways Ltd.	4, 9-4

TABLE 8-3 continued

Classification:

Class 1 – Scheduled Air Carriers

Air carriers who offer public transportation of persons, mails and/or goods by aircraft, serving designated points in accordance with a service schedule and at a toll per unit.

Class 2 – Regular Specific Point Air Carriers

Air carriers who offer public transportation of persons, mails and/or goods by aircraft serving designated points on a route pattern and with some degree of regularity, at a toll per unit.

Class 3 – Irregular Specific Point Air carriers

Air carriers who offer public transportation of persons, mails and/or goods by aircraft from a designated base, at a toll per mile or per hour for the charter of the entire aircraft, or at such other tolls as may be permitted.

Class 4 – Charter Air Carriers

Air carriers who offer public transportation of persons and/or goods by aircraft from a designated base, at a toll per mile or per hour for the charter of the entire aircraft, or at such other tolls as may be permitted. Class 4 charter air carriers, using fixed wing aircraft, are divided into three groups:

Group A – Class 4 air carriers who operate one or more aircraft each of which has a maximum authorized take-off weight on wheels in excess of 18,000 pounds.

Group B – Class 4 air carriers who operate one or more aircraft each of which has a maximum authorized take-off weight on wheels in excess of 2,500 pounds but not greater than 18,000 pounds.

Group C – Class 4 air carriers who operate one or more aircraft each of which has a maximum authorized take-off weight on wheels not greater than 2,500 pounds.

Explanation of Abbreviations

- 1 Class 1 Scheduled
- 2 Class 2 Regular Specific Point
- 3 Class 3 Irregular Specific Point
- 4A Class 4, Group A, Charter
- 4B Class 4, Group B, Charter
- 4C Class 4, Group C, Charter
- 4AB Class 4, Groups A and B, Charter
- 4ABC Class 4, Groups A, B and C, Charter
- 4BC Class 4, Groups B and C, Charter
- 8 International Scheduled
- 9-3 Class 9-3 International Irregular Specific Point
- 9-4 Class 9-4 International Non-Scheduled Charter

TABLE 8-4
COMMERCIAL AIR SERVICES
NORTHWEST TERRITORIES

Point	Carrier	Class of Service
Aklavik	Northward Aviation Ltd., #8 Hangar, Edmonton Industrial Airport, Edmonton, Alta.	2
Arctic Bay	Atlas Aviation Ltd. Resolute Bay, N.W.T.	3
Arctic Red River	Northward Aviation Ltd.	2
Baker Lake	Transair Ltd., International Airport, Winnipeg, Man.	2
Broughton Island	Nordair Ltd. #6 Hangar, Montreal Airport, Dorval, P.Q.	3
Cambridge Bay	Northward Aviation Ltd.	3, 4AB
	Northwest Territorial Airways Ltd. P.O. Box 100, Yellowknife, N.W.T.	3
	Pacific WesternAirlines Ltd., Vancouver Airport, Vancouver, B.C.	2
Cameron Bay	Cameron Bay Air Services Ltd., 3rd Floor, Guaranty Trust Bldg., Edmonton, Alta.	4B
Cape Dorset	Austin Airways Ltd., Toronto Island Airport, Toronto, Ont.	2
	Nordair Ltd.	3
Cape Dyer	Nordair Ltd.	2
Chesterfield Inlet	Transair Ltd.	3
Clyde River	Nordair Ltd.	3
Coppermine	Northward Aviation Ltd.	3
	Northwest Territorial Airways Ltd.	3
Coral Harbour	Nordair Ltd.	3
	Transair Ltd.	2, 3
Cullaton Lake	Transair Ltd.	3
Eskimo Point	Transair Ltd.	3
Eureka	Atlas Aviation Ltd.	3

Point	Carrier	Class of Service
Fort Franklin	Northward Aviation Ltd. Nakanni Air Services Ltd. Reindeer Air Service Ltd.	2 4B 3
Fort Good Hope	Northward Aviation Ltd.	2
Fort McPherson	Arctic Air Ltd. Northward Aviation Ltd.	3 2
Fort Norman	Northwest Aviation Ltd. Reindeer Air Service	2 3
Fort Simpson	Arctic Air Ltd. Fort Simpson, N.W.T. Pacific Western Airlines Ltd.	3, 4B 1
Fort Smith	Buffalo Airways Ltd. Fort Smith, Y.T.	4B
	Gateway Aviation Ltd. #12 Hangar, Municipal Airport, Edmonton, Alta.	4B
	Kenting Aircraft Ltd. #1 Hangar, McCall Field, Calgary, Alta.	4(C)
	Pacific Western Airlines Ltd.	1, 2
Frobisher	Nordair Ltd. Wheeler-Northland Airways Ltd. P.O. Box 217, St. Jean, P.Q.	2, 3, 4A 3, 4B
Gjoa Haven	Northward Aviation Ltd.	3
Grise Fiord	Atlas Aviation Ltd.	3
Hall Beach	Aviation Development Consultants Nordair Ltd.	4B
	Transair Ltd.	3
Hay River	Carter Air Service, P.O. Box 128 Hay River, N.W.T.	4B
	McKenzie Air Ltd. #9 Hangar, Industrial Airport, Edmonton, Alta.	4BC
	Pacific Western Airlines Ltd.	1
Holman Island	Northward Aviation Ltd.	3
	Northwest Territorial Airways Ltd.	3
Hope Lake	Northwest Territorial Airways Ltd. Pacific Western Airlines Ltd.	3 2
Igloolik	Nordair Ltd.	3

Point	Carrier	Class of Service
Inuvik	Aklavik Flying Service Ltd.	4B
	Great Northern Airways Ltd. #3 Hangar, McCall Field, Calgary 67, Alta.	2, 4AB
	Northward Aviation Ltd.	2, 4B, 9-4
	Pacific Western Airline Ltd.	1
	Reindeer Air Service Ltd. Reindeer Station, N.W.T.	3, 4ABC
Isachsen, NWT	Atlas Aviation Ltd.	3
Lady Franklin	Northwest Territorial Airways Ltd.	3
Lake Harbour	Wheeler-Northland Airways Ltd.	3
Melville Island	Atlas Aviation Ltd. Northwest Territorial Airways Ltd. Pacific Western Airlines Ltd.	3 3 3
Mould Bay	Atlas Aviation Ltd.	3
Norman Wells	Northward Aviation Ltd.	2, 4B
	Pacific Western Airlines Ltd.	1
Nueltin Lake	Transair Ltd.	3
Pangnirtung,	Nordair Ltd.	3
Pond Inlet	Atlas Aviation	3
Port Radium	Northwest Territorial Airways Ltd.	3
Rankin Inlet	Transair Ltd.	3
Repulse Bay	Transair Ltd.	3
Resolute	Pacific Western Airlines Ltd.	2
Resolute Bay	Atlas Aviation	3, 4BC
	Nordair Ltd.	2
Resolution	Pacific Western Airlines Ltd.	1
Sachs Harbour	Great Northern Airways Ltd.	3
Sawmill Bay	Minto Airways Ltd. 3rd Floor, Guaranty Trust Bldg., Edmonton, Alta.	4B
	Northwest Territorial Airways Ltd.	3
Spence Bay	Northward Aviation Ltd.	3
Tavani	Transair Ltd.	3
Tuktoyaktuk	Great Northern Airways Ltd. Northward Aviation Ltd. Reindeer Air Service Ltd.	3 2 4B
Wrigley	Pacific Western Airlines	1

Yellowknife	Gateway Aviation Ltd. Koenen's Air Service c/o Merrick & Co., Yellowknife, N.W.T.	4B 4B, 9-4
	Northward Aviation Ltd.	3, 4B
	Northwest Territorial Airways Ltd.	3, 4AB, 9-4
	Pacific Western Airlines Ltd.	1, 2, 4A
	Ptarmigan Airways Ltd. c/o Mark M. de Weerdt, Yellowknife, N.W.T.	4BC
	Reindeer Air Service Ltd.	3
	Sioux Narrows Airways Airport Hotel, Winnipeg, Man.	4B
	Transair Ltd.	3
	Wardair Canada Ltd. Macdonald Hotel, Edmonton, Alta.	4AB

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Class 3 — Irregular Specific Point Air Carriers

Air carriers who offer public transportation of persons, mails and/or goods by aircraft from a designated base, at a toll per mile or per hour for the charter of the entire aircraft, or at such other tolls as may be permitted.

Class 4 — Charter Air Carriers

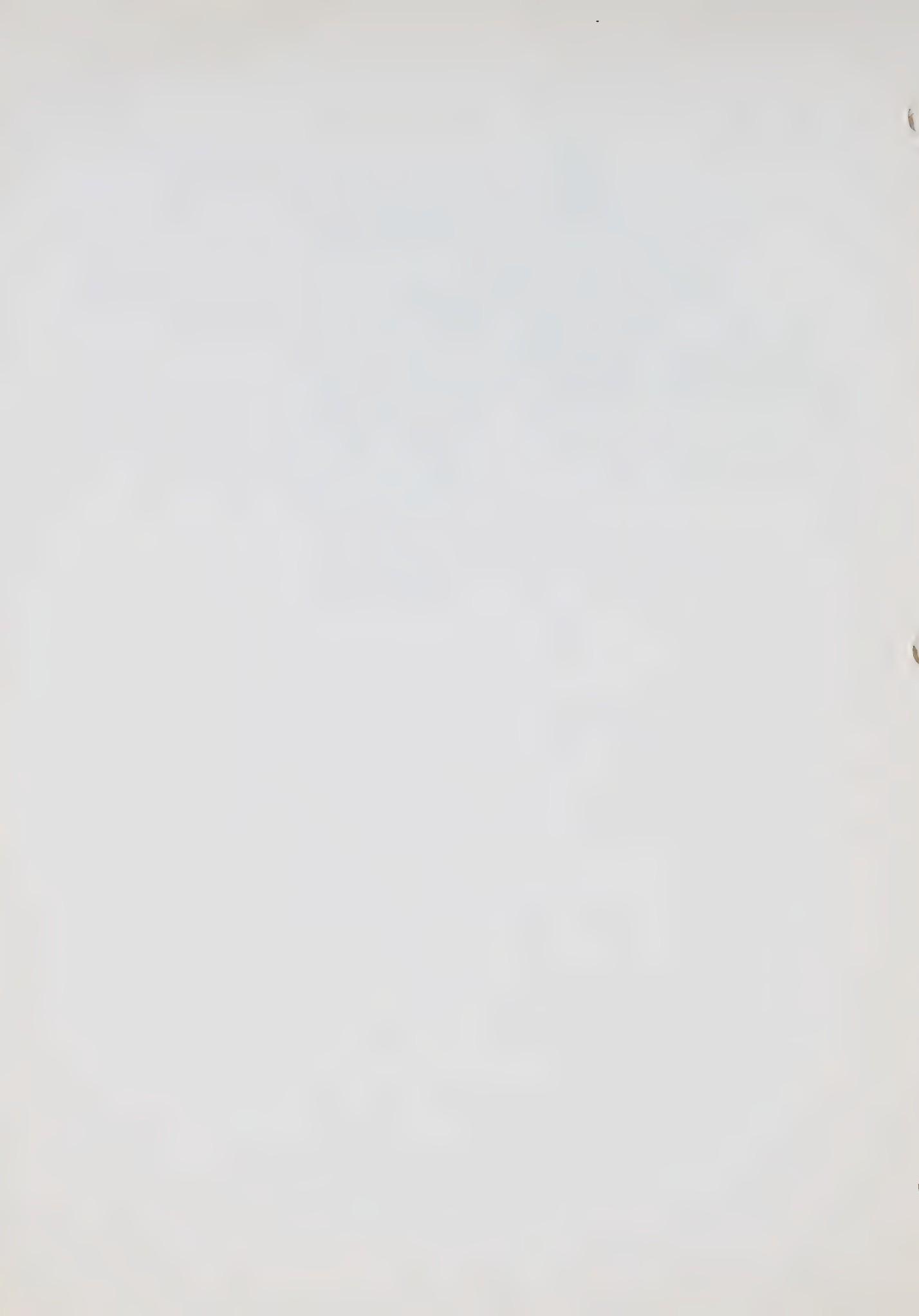
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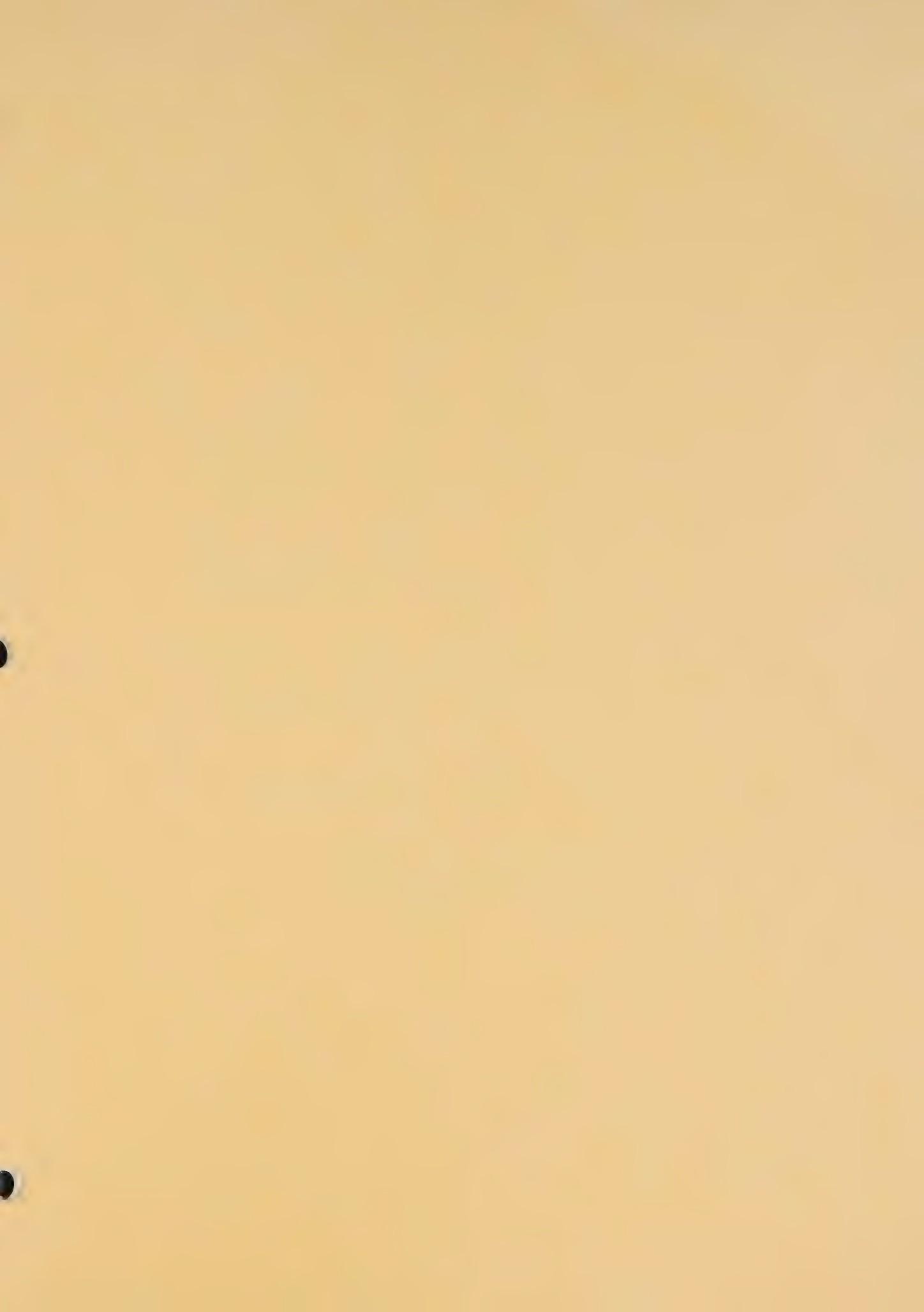
northern economic
development branch
department of indian affairs
and northern development
government of canada



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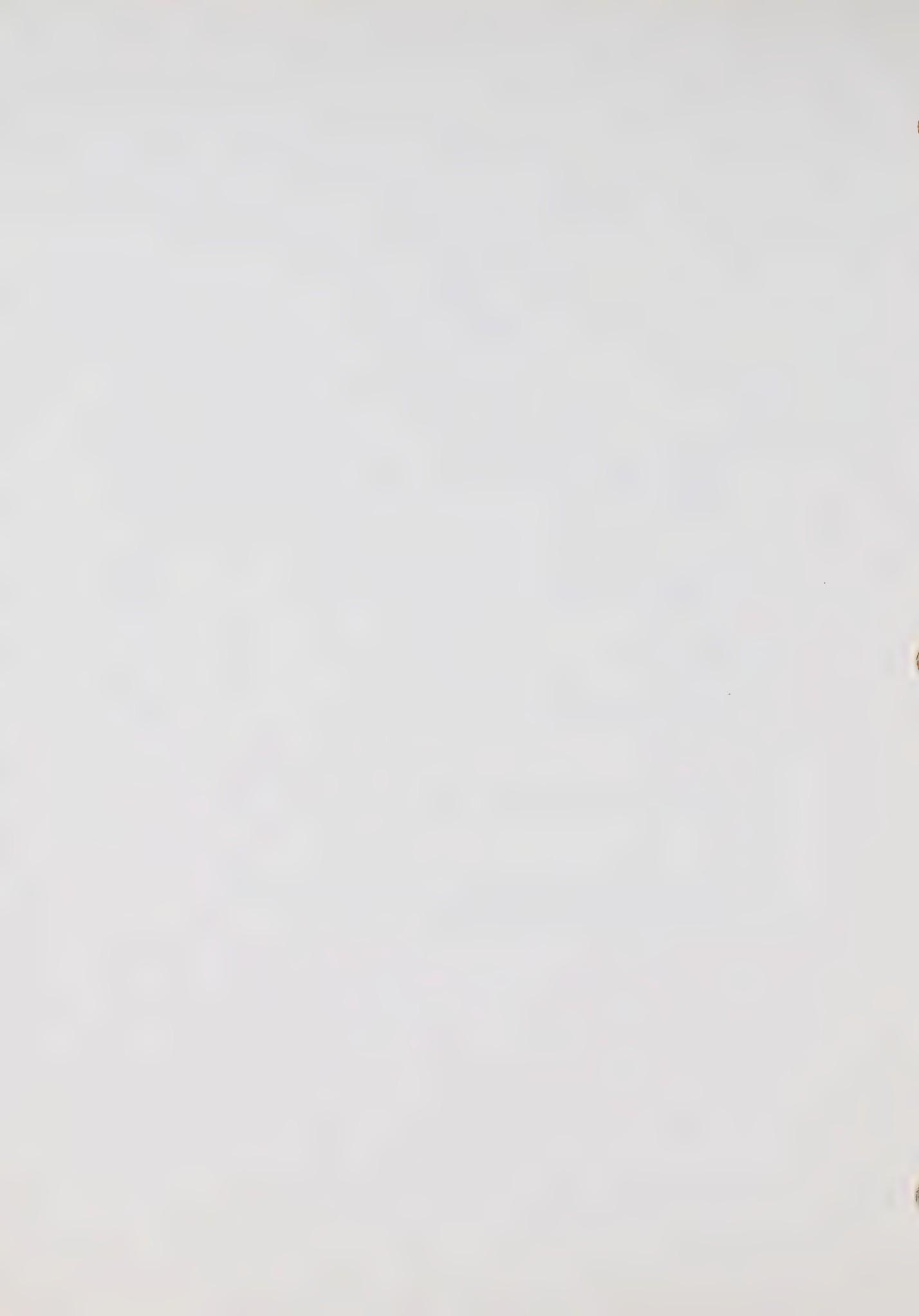
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Social Problems	9A-1.1.3
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Map

9A-1 Distribution of Indian and Eskimo Population

Tables

9A-1 Distribution of Population by Major Ethnic Group, Age Group and Sex
9A-2 Labour Force by Occupation and Ethnic Groups by Sex
9A-3 Total Population and Population Density



PEOPLE

9A-1.1 - GENERAL

The human resources is the key to the successful development of all the natural resources North of 60. Like the other resources, the human resource has barely been developed. The Federal Government, through the Department of Indian Affairs and Northern Development, and other departments and agencies, considers the full participation of the indigenous peoples in the economic life of the Territories a main objective in the development of the northern regions.

The percentages of wage earners and experienced workers in the potential labour force of the Territories is significantly lower for the indigenous people than for the other ethnic groups, but in recent years, with the development of new education facilities and employment opportunities, these percentages are increasing.

A recent study of the labour force in the Territorial mining industry indicated that indigenes comprise only 4.5 per cent of the total work force — in contrast to the fact that, according to the 1961 Census, indigenes comprise 45.3 per cent of the Territorial population. The proportion of indigenes in the work force of other Territorial industries is also known to be relatively low. The reasons for the lower labour force participation rates of indigenes cannot be simply stated but certain problem areas can be discerned. Probably the most important of these interrelated areas are:

- a) the educational background of the indigenous population;
- b) the labour force requirements and attitudes of the industry involved;
- c) the social problems of indigenes when they are placed in an industrially-oriented community; and
- d) housing.

An added important factor affecting the labour force generally is the movement of persons within the Territories. The economic and sociological climate has in the past resulted in sudden changes in the way of life of the indigenes. However, as the economy and the sociological environment becomes more stabilized, with the development of industry, permanent housing and community amenities, the participation of indigenes in the labour force will show a positive change.

9A-1.1.1 – Education

There is an unfortunate tendency to classify all indigenes as uneducated and unskilled. However, in education and skill characteristics, indigenous people of the Territories are *not* a homogeneous group. In general, older indigenes possess relatively low levels of education and skill, but relatively good work records, whereas many indigenes in the younger age groups (particularly those under 25) possess average or above, levels of education and skill. In recent years basic and vocational educational opportunities have become more widely available to Territorial residents and there are clear indications that more indigenes are taking advantage of these opportunities. The participation of all Territorial residents in basic education has markedly increased during the last ten years, and it is estimated that at present at least 93 per cent of Territorial school age children are attending school. In addition to basic education, prevocational and vocational training centres for Territorial residents are located at Whitehorse, Yellowknife, and Fort Churchill, Man. Programs have also been instituted whereby qualified Territorial residents

9A-1.1.1

may continue, or upgrade, their education in provincial institutions (vocational schools, technological institutes and universities) when the training required is not available in the Territories.

To assist adults whose lack of academic training in their early years has inhibited their chances of successful employment, occupational training, occupational certification, apprenticeship, language and upgrading programs, are being offered in several northern areas such as Yellowknife, Fort Churchill, Hay River, Fort Smith and Inuvik. In some of these programs, students spend half their school day in on-the-job training and the other half in accelerated upgrading programs. Again, if suitable courses are not available in the Territories, arrangements are made for training to be undertaken in the provinces.

This range of education programs has been very well accepted by industrial and governmental employers, and demand for program graduates has exceeded the available supply. Thus it seems very likely that the young indigenous population is becoming a significant potential source of labour for industries in the Territories and other parts of Canada. For "older" indigenes (this group includes relatively uneducated indigenes between 20 and 30 years of age), programs providing upgrading and retraining courses are helping this indigenous group to achieve greater labour force participation.

At present the Department of Indian Affairs and Northern Development, in conjunction with the Territorial governments, is working towards improving the effectiveness of the various educational programs. Areas which are being given particular attention include:

- a) Expansion of the basic education system to encompass all school age children;
- b) The provision of pre-school courses (e.g., in language and basic knowledge) which help to prepare indigenes for schooling;
- c) The extension of adult education programs, including language upgrading courses;
- d) The extension of Occupational Training for Adults programs;
- e) Encouragement of more indigenes to take advantage of present educational opportunities;
- f) Mobility and relocation assistance;
- g) The provision of more vocational and advanced education opportunities – this includes a detailed assessment of the type of programs required;
- h) Involvement of Territorial employers in planning the type of vocational training required.

Responsibility for the provision and development of basic and vocational education programs lies mainly with the Department of Indian Affairs and Northern Development, but the Department of Manpower and Immigration has responsibility for certain types of adult occupational training and for the provision of counselling and labour market information services. At present the Department of Indian Affairs and Northern Development performs certain functions which are normally the responsibility of the Department of Manpower and Immigration and will continue to do so until that Department is able to provide staff and Canada Manpower Centres in the Territories.

9A-1.1.2 – Requirements and Attitudes

There is an increasing tendency for most industries to require the services of fewer unskilled labour resources, and the mining industry is no exception to this tendency. This tendency not only severely limits the opportunities for unskilled workers, but it also limits opportunities for casual workers. Positions calling for skilled and semi-skilled workers which generally involve work on a day-to-day basis may be available.

With the exception of the younger, more educated group, there are few indigenous labour groups possessing the skills and aptitudes required by the modern enterprise. Few older indigenes can be classified as skilled or semi-skilled workers and some members of this group prefer to work on a casual day-to-day basis. For such workers employment opportunities are greatly affected by the employment attitudes of the mining company concerned. If the company displays patience and understanding some progress can be made, for experience has shown that it may take some time for indigenous workers to become accustomed to industrial conditions and to learn new skills and responsibilities. However, if indigenes are given time to build up physical strength, adjust socially, and learn job skills, initial problems can be markedly decreased. These initial problems are complex and their solution requires close co-operation between company and government personnel. For example, companies cannot be expected to accept continued absenteeism and low-productivity from their employees, yet in the long run companies stand to gain from employing more indigenes — through lower hiring costs and turnover rates.

Currently, governmental agencies are involved in close liaison with Territorial companies in such areas as:

- a) Determination of the labour requirements of the companies;
- b) Initiation and maintenance of contacts with indigenes who could conceivably meet the companies' labour requirements;
- c) Arranging and co-ordinating of required training programs — on the job and/or at specific training centres;
- d) Investigation of the need for payments to the company (per worker) during the first few months of employment;
- e) Checking the physical fitness and dietary need of indigenes during the initial period of employment;
- f) Facilitating the integration of indigenes into the community, for example, by planning recreation programs, and by conducting home management programs.

With close co-operation between government and industry, there could be a significant increase in the employment of the older and relatively uneducated indigenes. The problems associated with the employment of the younger (generally better educated) indigenes are not as great, but here again co-operation is necessary to ensure that the potential of these labour resources is fully realized.

9A-1.1.3 – Social Problems

Better education alone does not ensure that indigenes will be employed by northern employers. Many of these people (even in the younger generation) retain strong bonds with their traditional environment and complete acceptance of the industrial way of life cannot be expected immediately. The social integration and acceptance of indigenes will only occur gradually but the type of government/industry co-operation discussed above should help to alleviate transition problems.

9A–1.1.4

9A–1.1.4 – Housing

Housing is a very important factor in the social integration and continued employment of indigenes. Experience has shown that married male indigenes are often very reluctant to leave their wives and families for more than a few weeks at a time. This is also a problem with non-indigenous married males, but it appears to be much more serious in the case of indigenes. To help overcome the problem, the Department operates several programs whereby houses are provided for indigenous people on a variety of bases (grant, purchase, rental).

Problems associated with the employment of indigenous people are currently the subject of several studies being undertaken by the Department of Indian Affairs and Northern Development. It is hoped that these and other studies will help to further accelerate the process of absorbing more indigenes into the territorial work force and so enable these people, and their employers, to further benefit from economic development of the region.

9A-2.1 – YUKON

9A-2.1.1 History

The Indians of the Yukon Territory divide into two principal groups; the Déné or Athapaskans in the interior, and a northern fringe of the Tlingit tribe who live in the south-western part of the Territory. The Dene people are again divided. The Loucheux tribe is found primarily in the Peel and Porcupine River areas with their main settlement at Old Crow. A second tribe, made up of Kutchin Indians, live in the Yukon River watershed to the south. The Kutchins are often referred to as the "Sitck" Indians, a term meaning "of the forest". In addition to the Dene and Tlingit groups, a few Nahanni Indians are found in the southeastern corner of the Yukon Territory near Frances Lake and the streams draining into the Liard River.

Archaeological remains indicate that the short Arctic Coast of the Yukon (about 135 miles) once supported a fairly substantial Eskimo population. There are no Eskimo communities on this coast now; most of the Eskimos found in this area are travelling along the coast to or from the Mackenzie Delta or Alaska.

Before the arrival of Europeans in the Yukon, the natives depended entirely on fishing and hunting for their livelihood. As elsewhere, their way of life has changed considerably following white settlement in the area. This is particularly true in the southern Yukon and along the Yukon River where the younger generations of Indians have adopted "white" ways very rapidly.

The first available census figure in 1895 shows an estimated population of 2,600 Indians in the Yukon. In 1912, when the provincial and territorial boundaries assumed their present pattern, population was 1,839. In 1929, the Indian population sank to a record low of 1,264 and then it began to increase at a steady rate. In July 1965, the population stood at 2,460, just slightly less than the figure for 1895.

There appears to have been little or no "white" penetration of the Yukon Territory until the middle of the 19th century. Although the Russians had been exploring and exploiting Alaska since its discovery in 1741, they had penetrated inland only 300 miles from the Bering Sea by 1838, some 600 miles from what was to become the Yukon border.

Fur was the initial attraction to the Yukon, but gold quickly displaced it. Although the presence of gold was suspected, it was not until 1873 that prospectors began arriving in the Yukon in significant numbers. Many of the earlier arrivals came from California when the strike of '49 had passed. Some entered the Yukon from the north up the Yukon River from Alaska. Others coming in from the south were the first to cross the Chilkoot Pass in 1878. With the influx of miners, of whom there were several hundred by 1884, many of the fur posts turned to trading in prospectors' supplies, and a water supply route was established by river steamers on the Yukon River. In August 1896, the famous Klondike strike was made on Bonanza Creek. Thousands of gold seekers poured into the area, and Dawson City, at the junction of the Klondike and Yukon Rivers, quickly grew into a mining, and trading community of some 25,000 people and captured a colorful place in Canadian history.

By 1901 the total population of the Yukon was over 27,000 and of this total about 3,000 or nearly 12 per cent were Indians. Nearly all of the 24,000 whites were in the vicinity of Dawson City and in search of gold. However, by 1902 and 1903, the successful began to leave and by 1910 the population of the Yukon had fallen to 8,512.

9A-2.1.1

For the next 35 years, until the mid-years of World War II, the population fluctuated between 4,000 and 5,000. During this period the Indian population accounted for one-third of the total. From 1941 to 1951 the population doubled from 4,194 to 9,906. This impressive increase resulted from the influx of construction workers and military personnel required to build and maintain national defence installations and communications facilities.

The upward trend continued after the war and during the ten-year period 1951-61, the population increased 47 per cent to 14,628. This growth can be attributed mainly to increased exploitation of the Territory's natural resources and to expanded government activity.

9A-2.1.2 – Population Characteristics

The 1961 Census showed nearly all of the inhabitants of the Territory to be resident in or around Whitehorse and five smaller communities. Some 5,031 persons, or 34 per cent of the total population, lived within the municipal boundaries of Whitehorse. Add those in the surrounding subdivisions and about one-half of the Yukoners are accounted for. The major part of the remaining population was divided between Dawson City, Watson Lake, Elsa, Calumet and Mayo. Within this pattern the Indian population numbered 2,027 or almost 15 per cent of the total.

The Yukon population in the 0 to 4 year-age group is 33 per cent higher than the similar age group for Canada as a whole. However, the 10 to 19 year-age group shows a marked decrease and is, in fact, 25 per cent lower than comparable national figures. This is due in part to the high birth rate of the Indian population (which accounted for almost 15 per cent of the total population in 1961).

The definite downward trend from the infant group to the teenage group reflects both the higher than normal infant mortality amongst the Indian people and the tendency for many white families to move "outside" in search of better educational facilities at the secondary school level. This latter factor has decreased substantially with the greatly improved secondary and trade schools which have been built in Whitehorse, Dawson and Watson Lake, since 1960; but a large percentage of the white children are still either pre-school age or early school-grade students.

The white population in the 20 to 40 year-age group numbers nearly 45 per cent of the total. Besides contributing to the higher than normal birth rate, this distribution indicates the itinerant nature of much of the white segment who come to the Yukon to work and then leave after a few years. The presence of relatively large groups of military personnel and Federal Government employees is significant. They move at government expense and constitute a much larger portion of the Yukon population than would be the case in the provinces.

Yukoners, 60 years of age and over, represent only approximately 5 per cent of the total population, whereas for Canada this group represents a substantial 11 per cent. Again this can be attributed to the fact that many of the adult whites leave the Yukon for family reasons given earlier or when they retire.

The 1961 Census recorded 8,178 males and 6,450 females in the Yukon. This ratio of 126 males to 100 females is considerably higher than the all-Canada ratio of 102 males to 100 females. Although significant, this imbalance is not unusual in a frontier area.

9A-2.1.3 – Labour Force

The Yukon Territory has 64 per cent of its population within the potential labour force age group, that is, 15 years of age and over. This compares with the all-Canada figure of 66 per cent. The figure for the experienced labour force in the Yukon of 67 per cent is considerably higher than the national figure of 54 per cent and reflects to some degree the disproportionate ratio of males to females within the Territory compared with Canada as a whole.

As with the Northwest Territories, the percentages of wage earners and experienced workers in the potential labour force are significantly lower for indigenes than they are for other ethnic groups. Again it is emphasized that although this is the current situation, the participation rates of indigenes are showing significant rates of increase.

9A–3.1

9A–3.1 – NORTHWEST TERRITORIES

9A–3.1.1 – History

Before the white man arrived in the Northwest Territories the Indians and Eskimos had evolved successful cultures of seasonal nomadism based on hunting and fishing. Mammals, birds and fish provided food, clothing, fat and oil for heating and lighting, implements and even weapons for the hunt. That state of existence prevailed, more or less unaltered, for four to five thousand years with the Eskimos inhabiting the arctic coastal areas and treeless tundra and the Indians the sub-arctic spruce forests.

There were several tribes of Indians chiefly of the Athapaskan linguistic stock. In the east, the Chipewyans ranged from Hudson Bay to Lake Athabasca; to the northwest there were the Yellowknives, the Dogrib, the Hare and the Bear Lake Indians. The Slaves and Loucheux occupied the Mackenzie River Valley. These tribes consisted of bands of varying size under the leadership of one strong man or chief. They roamed in small bands, often camping for several weeks or even months at a fishing area or caribou crossing. The Athapaskan tribes made frequent trips into the tundra during the summer and fall to hunt caribou and muskoxen, going as far as the arctic coast in the vicinity of Coronation Gulf.

The Eskimos, with the exception of a group in the interior of Keewatin, had developed a primarily coastal culture. They were divided into small family groups and moved with the game resources of their region. Usually, they hunted in the coastal areas but in summer they made special hunts inland for caribou and muskoxen. They also made occasional trips to the vicinity of the tree-line to cut wood for sledge runners, tools and implements.

Although their hunting areas were adjacent and their way of life similar, the Indians and Eskimos remained apart and seldom met except in strife. There was little or no cultural exchange and no intermarriage between the two races.

The European explorers of the 16th, 17th and 18th centuries were the first white men to contact the Indians and the Eskimos. Although encounters between explorers and northern natives were numerous during that period, they did not result in much change in the traditional native way of life. The explorers were followed by the whalers and the fur traders and they, in turn, by the missionaries, Royal Canadian Mounted Police, and northern pioneers. Small settlements grew up around the trading posts and missions along the main waterways and introduced a new way of life to the North.

It was the fur trade that had the greatest impact on the northern peoples. The Indians and Eskimos were encouraged to trap fur bearers which previously had little use and as a result they spent less time at their traditional hunting pursuits. The rifle enabled them to kill game more efficiently but larger dog teams were necessary for winter travel on their new traplines. These developments made excessive demands on the game resources over wide areas.

At the same time the isolated trading posts gradually became permanent settlements as Indian or Eskimo families settled near the source of trade goods and were attracted by the white man's activities. Many of the settlements became centres of transportation and jumping off spots to the interior for trappers, prospectors and government research parties.

By 1900 there were 13 settlements in the Mackenzie Valley connected by water transportation; in the eastern Arctic there were only a few isolated trading posts. When the present boundaries of the Northwest Territories were set in 1912, the population was over 6,000 persons of which all but a small proportion were Indians and Eskimos.

In the following fifty years there was a steady increase in the population of the Territories. The growth in the Indian and Eskimo populations during that period resulted from a fairly rapid rate of natural increase, while the growth in the white population of the Territories was due mainly to immigration. People moved north in response to various resource developments and government programs. The number of whites in the Territories was less than 1,000 in 1921, but had more than doubled by 1941. The fur resources and the discovery of oil at Norman Wells attracted an influx of whites in the 1920s. Discovery of gold at Yellowknife and pitchblende at Great Bear Lake in the 1930s brought increasing numbers to the Mackenzie District and led to the establishment of Federal Government administrative centres. In the 1940's activities connected with the war, the Canol pipeline, airfield construction, and uranium mining at Great Bear Lake, spurred additional immigration. In the decade preceding the 1961 Census the total territorial population increased by 43 per cent, the white population alone by 83 per cent. This impressive growth in the white population resulted from greatly expanded government activities in the North, mainly defence and social programs, and extensive construction and road building. By 1966 the population had increased to 28,738.

9A-3.1.2 – Population Characteristics

Although the "white" group includes Metis, enfranchised Indians and people of other ethnic origin, it is composed primarily of people of European descent who made up 91 per cent of the group and 39 per cent of the total population of the Territories in 1961.

Two striking features of the territorial population are the high proportion of the population in the very young, 0–4 years age group, and the very low proportion of the population in the 60 years and over age group. The high birth rate of the native population is the most important factor in the large percentage in the very young age group. Factors contributing to the small percentage of the population in the over 60 age group are the high death rates of the native people, particularly of the Eskimos, and the strong tendency on the part of whites, especially those not born in the Territories, to leave at or near retirement age.

The proportion in the teenage groups (10 to 14 and 15 to 19 years) in the population of the Northwest Territories is similar to the proportion in these age groups in the population of the rest of Canada.

That portion of the population in the age group of 20 to 44 years constitutes the prime labour force of a region and most important to its economy. Employment statistics for all of Canada show that people in this age group enjoy the highest rate of employment of all potentially employable persons. The proportion of the population of the Territories in this age group is significantly higher than for Canada as a whole. However, the number in this group is somewhat biased because of the seasonal nature of employment in the North. Census data are gathered during the summer months when there is an influx into the Territories of seasonal workers in all categories of employment, from construction to research, and they are recorded in the data for the Territories; Exclusion of these seasonal workers would probably bring the percentage for this age group more into line with that for the rest of Canada.

The population of the Territories also has a high ratio of males to females. The 1961 Census showed 126 males to each 100 females. No doubt, the high male-female ratio in the Territories was also affected by the influx of seasonal workers who were almost all male.

9A-3.1.3 – Labour Force

Usually a region with a large potential labour force (population 15 years of age and over) in relation to its total population has a major asset for favourable economic growth and development. The Northwest Territories has 60 per cent of its population within this potential labour force age range as compared with 66 per cent for all Canada in 1961. The percentage for the experienced labour force in the Territories is in line with the percentages for Canada and the provinces and the percentage of wage earners is only slightly lower.

The distribution of this potential labour force shows that 7,165 persons or 52 per cent, were Indians and Eskimos. However, only 2,671 of these or 34 per cent qualified in the experienced labour force category.

Carrying the analysis further to the actual wage earners at the time of the 1961 Census, there were only 392 Indians and 723 Eskimos employed in contrast with 4,321 white wage earners. Thus only 16 per cent of the Indian and Eskimo potential labour force were wage earners while 65 per cent of the white population in this category were earning wages.

Despite the markedly lower work force participation rates of territorial indigenous people, it must be emphasized that this situation is expected to alter significantly in the near future.

TABLE 9A-1

TABLE 9A-1
Distribution of Population of the Yukon & N.W.T.,
by Major Ethnic Groups, Age Groups and Sex
1961

Age Group	Native Indians ^a			Per Cent by Age Group			All Other Ethnic Groups			Per Cent by Age Group			Total Female			Per Cent by Age Group Y.T., CAN.		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
I. YUKON TERRITORY																		
0 - 4	209	200	409	18.6	1,009	919	1,928	15.5	1,218	1,119	2,337	16.0	12.4	12.4	12.4	12.4	12.4	12.4
5 - 9	153	161	314	14.2	730	717	1,447	11.6	883	878	1,761	12.0	11.4	11.4	11.4	11.4	11.4	11.4
10 - 14	120	111	231	10.5	486	470	956	7.7	606	581	1,187	8.1	10.2	8.1	10.2	8.1	10.2	8.1
15 - 19	96	123	219	9.9	286	260	546	4.4	382	383	765	5.2	7.8	5.2	7.8	5.2	7.8	5.2
20 - 24	88	89	177	8.0	549	383	932	7.5	637	472	1,109	7.6	6.5	7.6	6.5	7.6	6.5	7.6
25 - 29	118	154	272	12.3	1,589	1,095	2,684	21.6	1,707	1,249	2,956	20.2	13.6	20.2	13.6	20.2	13.6	20.2
30 - 34	96	105	201	9.1	1,146	771	1,917	15.4	1,242	876	2,118	14.5	13.1	14.5	13.1	14.5	13.1	14.5
35 - 39	77	73	150	6.8	677	416	1,093	8.8	754	489	1,243	8.5	10.3	8.5	10.3	8.5	10.3	8.5
40 - 44	45	41	86	3.9	405	186	591	4.8	450	227	677	4.6	7.1	4.6	7.1	4.6	7.1	4.6
45 - 49	15	33	48	2.2	86	46	132	1.1	101	79	-	180	1.3	2.7	1.3	2.7	1.3	2.7
50 - 54	45	55	100	4.5	153	42	195	1.6	198	97	295	2.0	3.0	2.0	3.0	2.0	3.0	2.0
55 - 59	70+																	
TOTAL	1,062	1,145	2,207	100.0	7,116	5,305	12,421	100.0	8,178	6,450	14,628	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: a Includes Eskimos as at time of 1961 Census, there were only 40 Eskimos recorded in the Yukon.

TABLE 9A-1

TABLE 9A-1
 Distribution of Population of the Yukon & N.W.T.
 by Major Ethnic Groups, Age Groups and Sex
 1961

Age Group	Native Indian		Per Cent by Age Group		Eskimo		Per Cent by Age Group	
	Male	Female	Total	Male	Female	Total	Male	Female
2. NORTHWEST TERRITORIES								
0 - 4	401	463	864	16.4	806	774	1,580	19.8
5 - 9	389	372	761	14.6	579	549	1,128	14.1
10 - 14	321	364	685	13.0	539	512	1,051	13.2
15 - 19	227	211	438	8.3	372	382	754	9.5
20 - 24	206	219	425	8.1	348	364	712	8.9
25 - 34	335	335	670	12.7	578	519	1,097	13.8
35 - 44	248	217	465	8.9	418	347	765	9.6
45 - 54	198	171	369	7.0	280	218	498	6.2
55 - 64	147	146	293	5.6	127	118	245	3.1
65 - 69	58	47	105	2.0	35	38	73	0.9
70+	89	92	181	3.4	41	33	74	0.9
TOTAL	2,619	2,637	5,256	100.0	4,123	3,854	7,977	100.0
All Other Ethnic Groups								
Age Group	Male	Female	Total	Per Cent by Age Group	Male	Female	Total	Per Cent by Age Group
0 - 4	769	677	1,446	14.8	1,976	1,914	3,890	16.9
5 - 9	564	471	1,035	10.6	1,532	1,392	2,924	12.7
10 - 14	355	322	677	6.9	1,215	1,198	2,413	11.4
15 - 19	306	201	507	5.2	905	794	1,699	10.5
20 - 24	756	346	1,102	11.3	1,310	929	2,239	7.8
25 - 34	1,490	748	2,238	22.9	2,403	1,602	4,005	6.5
35 - 44	883	516	1,399	14.3	1,549	1,080	2,629	17.4
45 - 54	550	265	815	8.4	1,028	654	1,682	13.6
55 - 64	282	103	385	4.0	556	367	923	11.4
65 - 69	58	24	82	0.8	151	151	260	1.1
70+	67	12	79	0.8	197	137	334	2.6
TOTAL	6,080	3,685	9,765	100.0	12,822	10,176	22,998	100.0
N.W.T.								
Age Group	Male	Female	Total	Per Cent by Age Group	Male	Female	Total	Per Cent by Age Group
0 - 4	769	677	1,446	14.8	1,976	1,914	3,890	16.9
5 - 9	564	471	1,035	10.6	1,532	1,392	2,924	12.7
10 - 14	355	322	677	6.9	1,215	1,198	2,413	11.4
15 - 19	306	201	507	5.2	905	794	1,699	10.5
20 - 24	756	346	1,102	11.3	1,310	929	2,239	7.8
25 - 34	1,490	748	2,238	22.9	2,403	1,602	4,005	13.6
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55 - 64	282	103	385	4.0	556	367	923	10.3
65 - 69	58	24	82	0.8	151	151	260	4.0
70+	67	12	79	0.8	197	137	334	1.1
TOTAL	6,080	3,685	9,765	100.0	12,822	10,176	22,998	100.0
CAN.								
Age Group	Male	Female	Total	Per Cent by Age Group	Male	Female	Total	Per Cent by Age Group
0 - 4	769	677	1,446	14.8	1,976	1,914	3,890	16.9
5 - 9	564	471	1,035	10.6	1,532	1,392	2,924	12.4
10 - 14	355	322	677	6.9	1,215	1,198	2,413	11.4
15 - 19	306	201	507	5.2	905	794	1,699	10.5
20 - 24	756	346	1,102	11.3	1,310	929	2,239	7.8
25 - 34	1,490	748	2,238	22.9	2,403	1,602	4,005	17.4
35 - 44	883	516	1,399	14.3	1,549	1,080	2,629	11.4
45 - 54	550	265	815	8.4	1,028	654	1,682	13.1
55 - 64	282	103	385	4.0	556	367	923	10.3
65 - 69	58	24	82	0.8	151	151	260	4.0
70+	67	12	79	0.8	197	137	334	1.1
TOTAL	6,080	3,685	9,765	100.0	12,822	10,176	22,998	100.0

TABLE 9A-2

TABLE 9A-2
Labour Force by Occupation and Major Ethnic Groups by Sex
1961

Occupation	Native Indian ^a			All Other Ethnic Groups			Per Cent (of total)	Total	Female	Total	Y.T. CAN.
	Male	Female	Total	Male	Female	Total					
1. YUKON TERRITORY											
Managerial	3	—	3	0.7	409	89	498	8.6	412	89	501
Professional & technical	3	1	4	0.9	290	207	497	8.5	293	208	501
Clerical	—	—	—	194	432	626	10.8	194	432	626	10.0
Sales	3	—	3	0.7	70	88	158	2.7	73	88	161
Service & recreation	32	62	94	22.1	658	401	1,059	18.2	690	463	1,153
Transportation & communication	21	—	21	4.9	622	18	640	11.0	643	18	661
Farmers & farm workers	10	—	10	2.3	23	—	23	0.4	33	—	33
Loggers & related workers	13	—	13	3.1	29	—	29	0.5	42	—	42
Fishermen, trappers & hunters	61	5	66	15.5	8	1	9	0.2	69	6	75
Miners, quarrymen & related workers	12	—	12	2.8	559	1	560	9.6	571	1	572
Craftsmen, production process & related workers	49	2	51	12.0	1,248	21	1,269	21.8	1,297	23	1,320
Labourers, n.e.s.s.	118	—	118	27.7	215	8	223	3.8	333	8	341
Occupation not stated	23	8	31	7.3	163	62	225	3.9	186	70	256
TOTAL, ALL OCCUPATIONS	348	78	426	100.0	4,488	1,328	5,816	100.0	4,836	1,406	6,242
											100.0

NOTE: a Eskimos included with Indians as only 40 Eskimos in Yukon at time of 1961 Census.

TABLE 9A-2

Labour Force by Occupation and Major Ethnic Groups by Sex
1961

Occupation	Native Indian			Per Cent (of total)			Eskimo			Per Cent (of total)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
2. NORTHWEST TERRITORIES												
Managerial	—	—	1	1	0.1	6	—	—	6	0.3	0.3	6
Professional & technical	3	1	4	0.4	25	2	25	2	27	1.5	1.5	27
Clerical	3	—	3	0.3	5	3	5	3	8	0.5	0.5	8
Sales	10	8	18	2.0	9	3	9	3	12	0.7	0.7	12
Service & recreation	41	98	139	15.3	121	70	121	70	191	10.8	10.8	191
Transportation & communication	16	1	17	1.9	23	—	23	—	23	1.3	1.3	23
Farmers & farm workers	2	—	2	0.2	14	—	14	—	14	0.8	0.8	14
Loggers & related workers	8	—	8	0.9	1	—	1	—	1	0.1	0.1	1
Fishermen, trappers & hunters	494	7	501	55.3	1,015	5	1,015	5	1,020	57.8	57.8	1,020
Miners, quarrymen & related workers	10	—	10	1.1	43	—	43	—	43	2.4	2.4	43
Craftsmen, production process & related workers	62	12	74	8.2	123	18	123	18	141	8.0	8.0	141
Labourers, n.e.s.	102	2	104	11.5	232	2	232	2	234	13.3	13.3	234
Occupation not stated	17	8	25	2.8	43	2	43	2	45	2.5	2.5	45
TOTAL, all occupations	769	137	906	100.0	1,660	105	1,660	105	1,765	100.0	100.0	1,765
All Other Ethnic Groups												
Occupation	Male	Female	Total	Male	Female	Total	Male	Female	Total	N.W.T.	CAN.	Per Cent
Managerial	374	27	401	8.4	381	27	408	5.5	408	5.5	5.5	8.3
Professional & technical	496	259	755	15.8	524	262	786	10.5	786	10.5	10.5	9.7
Clerical	170	176	346	7.2	178	179	357	4.8	357	4.8	4.8	12.9
Sales	63	52	115	2.4	82	63	145	1.9	145	1.9	1.9	6.3
Service & recreation	501	248	749	15.7	663	416	1,079	14.5	1,079	14.5	14.5	12.3
Transportation & communication	413	21	434	9.1	452	22	474	6.4	474	6.4	6.4	6.1
Farmers & farm workers	7	—	7	0.1	23	—	23	0.3	23	0.3	0.3	10.0
Loggers & related workers	18	—	18	0.4	27	—	27	0.4	27	0.4	0.4	1.2
Fishermen, trappers & hunters	59	—	59	1.2	1,568	12	1,580	21.2	1,580	21.2	21.2	0.5
Miners, quarrymen & related workers	495	—	495	10.4	548	—	548	7.4	548	7.4	7.4	1.0
Craftsmen, production process & related workers	799	9	808	16.9	984	39	1,023	13.7	1,023	13.7	13.7	24.2
Labourers, n.e.s.	195	6	201	4.2	529	10	539	7.2	539	7.2	7.2	4.9
Occupation not stated	369	24	393	8.2	429	34	463	6.2	463	6.2	6.2	2.6
TOTAL, all occupations	3,959	822	4,781	100.0	6,388	1,064	7,452	100.0	7,452	100.0	100.0	100.0

Source: Dominion Bureau of Statistics

TABLE 9A-3
Total Population of the Territories, 1911 – 1966

	Year						
	1911	1921	1931	1941	1951	1961	1966
N.W.T.	6,507	7,988	9,723	12,028	16,004	22,998	28,738
YUKON	27,219	8,513	4,157	4,230	4,914	14,628	14,382
TOTAL	33,726	16,501	13,880	16,258	20,918	37,626	43,120

Source: Dominion Bureau of Statistics

Population Density, Canada, Selected Provinces and Territories, 1961

N.W.T.	0.02 persons per square mile				
Yukon	0.07	"	"	"	"
Newfoundland	3.20	"	"	"	"
Prince Edward Is.	47.91	"	"	"	"
Ontario	18.12	"	"	"	"
B.C.	4.53	"	"	"	"
Canada	5.12	"	"	"	"

Source: Canada Year Book, 1965



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GOODS AND SERVICES "B"

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Table

9B-1 Commercial Energy Producing Installations

DATA SHEET – GOODS AND SERVICES

9B-1.1 – CONSUMER PRICES

The cost of living North of 60 varies considerably, and ranges from about 20 to 40% higher than in southern Canada.

Following is an estimation of the price differences in the Yukon and Northwest Territories, compared with southern Canada. Southern Canada is used as the base for comparison at 100%.

The levels shown are typical of the differences existing in the more accessible regions of the two Territories. In the far northern mainland and the Arctic Islands, the differences may be twice as great. Figures are based on 1966 prices, the latest figures available.

	Southern Canada	Territories
Food	100	125
Tobacco and alcoholic beverages		
Tobacco products and smokers' accessories	100	100
Alcoholic beverages excluding beer	100	110
Beer	100	200
Clothing and personal furnishings		
Men's and boys' clothing	100	110
Women's and children's clothing	100	110
Footwear	100	110
Laundry and dry cleaning	100	110
Other	100	110
Shelter	100	130
Household operation		
Fuel Oil	100	180
Electricity	100	200
Gasoline	100	125
Telephone	100	120
Furniture	100	110
Home Furnishing	100	110
Appliances, radios and television sets	100	110
Other	100	110
Transportation		
Streetcar, railway and other fares	100	110
New automobiles, used automobiles &		
House trailers	100	100
Automotive operating expenses	100	130
Personal and medical care and death expenses.		
Medical and dental care	100	110

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Hospital care, private duty nursing, accident and sickness insurance, prepaid medical care.	100	110
Other	100	110
Miscellaneous		
Motion picture theatres	100	100
Newspapers and magazines	100	110
Net expenditure abroad	100	100
Other	100	110

No radio or television station in the Northwest Territories permits advertising to be sold, although as part of the Canadian Broadcasting Corporation national network commercial advertising does appear on both mediums.

Display newspaper advertising rates range from \$1.08 - \$1.50 a column inch in the four newspapers published in the Mackenzie District. Legal rates are generally 25 cents an agate line.

9B-1.1.1 – Taxes

Generally, residents of the Yukon and Northwest Territories are free of many of the taxes paid by Canadians living in the provinces.

Property taxes, including their counterpart (occupancy or rental taxes) which are the major financial base for all municipal or county activities, are levied in only six Territorial communities - Whitehorse and Dawson in the Yukon, and Yellowknife, Hay River, Fort Smith and Inuvik, in the Northwest Territories.

Property tax rates in these six communities vary widely, and therefore it is not possible to obtain a fair comparison with provincial rates. In addition, these communities do not have uniform procedures for handling special assessments and flat rate charges for such services as sewer, water, roads and business.

Many services provided, which would normally be paid through municipal and provincial taxes, are subsidized by the Federal Government or assisted through grants.

Some sample mill rates in the Northwest Territories:

YELLOWKNIFE		INUVIK	
General	32	General	15
School	40	School	12
Business Tax	36	No business tax	
FORT SMITH		HAY RIVER	
General	23	General	38
School	12	School	12
No business tax		Business tax	19

Provincial sales taxes which are levied in most Canadian provinces, and which vary in size from 3 to 8%, are not levied in the two Territories.

Less tax is paid to operate motor vehicles in these regions. Motor fuel in the Northwest Territories is taxed at 7.5 cents per gallon, and in the Yukon Territory at 4.1 cents, or one-half to one-third less than the tax levied in the provinces.

License fees for most motor vehicles are considerably less than those charged in the provinces. For example, the following fees are charged under the Motor Vehicle Ordinance of the Yukon Territory:

- a) *Operators licenses* are for a one-year period and may be obtained on production of a valid license from any other province in Canada or any of the United States. First issues must pass a written and a driver's test. Fee \$2.00.
- b) *Chauffeurs licenses* are the same as operators licenses, except that the written test has a few more questions. Fee \$5.00.
- c) *Automobile licenses* are issued for a one-year period. The fee is based on the wheelbase of the vehicle:

Under 100"	-	\$15.00
101" - 120"	-	\$20.00
Over 120"	-	\$25.00

A reduction of 50% is made on October 1, and a reduction of 75% on January 1.

- d) *Truck licenses* are divided into four categories based on hauling capacity:

1 ton or less	\$20.00
Over 1 ton to 3 tons	\$35.00
Over 3 tons to 5 tons	\$55.00
Over 5 tons	\$105.00

A reduction of 50% is made on October 1 and a reduction of 75% on January 1.

- e) *PSV and RES licenses* are licenses to haul goods in the Yukon Territory. The PSV license is non-restricted authority. The RES is a restricted authority. As in the other provinces of Canada, there is a requirement for advertising, filing of objections and if required, a public hearing, before the license is issued. These licenses are divided into categories:

Over 1 ton to 3 tons	\$ 35.00
Over 3 tons to 5 tons	\$130.00
Over 5 tons but with only two axles	\$155.00
More than two axles	\$255.00

- f) *Trailer licenses* are issued in two categories only:

1 ton or less	-	\$3.00
Over 1 ton	-	\$10.00

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g) *Through freighter licenses* are issued with the designation FT. These licenses are issued for hauling goods through the Territory only and are issued in only two categories:

5 tons and under	- \$105.00
Over 5 tons	- \$205.00

h) *Single trip permits* may be obtained from the agent at Watson Lake in two categories: for hauling goods into and out of the Territory, one single trip \$100.00; and hauling goods through the Territory only, \$50.00

i) *Compulsory insurance* in an amount not less than \$50,000 all-inclusive must be proven before any vehicle license is issued.

9B-1.1.2 Business Licenses and Regulations

Other examples of license and regulation requirements in the Yukon Territory:

a) *Business license ordinance.* Any person or company wishing to do business in the Yukon outside the limits of the City of Dawson or the City of Whitehorse, must obtain a business license. These licenses are divided into a number of categories, the greater number of which are issued for a fee of \$25.00. One notable exception is the Contractors License which is \$100.00 for non-resident and \$50.00 for a resident. Any company applying for a business license must produce proof of Workmen's Compensation insurance coverage for his employees, or take a statutory declaration to the effect that he does not have employees and that he will, if he becomes an employer, immediately take out Workmen's Compensation coverage.

At the present time, the publishing of newspaper and the business of searching for minerals, are exempted from the Business License Ordinance.

b) *Lien legislation.* The central office for the registration of liens is in the Department of the Territorial Secretary and Registrar General. Liens may be registered under the Bills of Sale Ordinance at a fee of \$1.00 per document; the Garage Keepers Lien Ordinance; the Conditional Sales Ordinance at \$1.00 per document, and also the Assignment of Book Debts Ordinance at a fee of 50c per document

c) *Companies Ordinance.* Any company doing business in the Territories must either be incorporated under the Companies Ordinance or registered extra-Territorially under the Ordinance. Registration and incorporation fees are determined by the amount of capital to be invested in the Territory.

d) *Corporation Securities Ordinance.* This Ordinance applies to the registration of mortgages or charges of chattels, or assignment of book debts of a corporation. Registration of either mortgage charge or assignment should be effected by filing with the Registrar within 30 days of the execution of the instrument. Fees are \$1.00 per document.

e) *Securities.* Before any securities may be sold in the Yukon they must be registered under the Securities Ordinance. This may be accomplished by filing a copy of the Prospectus of the company, approved by the Securities Commission of B.C., Alberta, or Ontario, with the Registrar of Securities.

f) *Workmen's Compensation.* All employees in the Yukon Territory must be covered with Workmen's Compensation under the Yukon Work's Compensation Ordinance. This can be accomplished either by obtaining an exemption order for those employees covered by extended provincial coverage, or by purchasing a policy of Workmen's Compensation insurance to cover those employees hired in the Yukon Territory. The compensation coverage is as follows:

1. 75% of earnings based on a maximum of \$5,600.00 per year.
2. To a dependent widow, \$100.00 per month.
3. To a dependent child under the age of 18 years, \$45.00 per month.
4. To a dependent invalid child of any age, \$45.00 per month.

9B-2.1. – WAGES AND SALARIES

Labour costs North of 60 vary widely. Wage and salary levels on the Arctic Islands and the coastal regions may range up to 20% higher than the levels for similar jobs in the more accessible areas.

Following is a table of labour costs based on estimated wage and salary levels for a projected mining operation in an isolated region of the mainland. Of course, costs depend on the actual location and type of operation being planned.

In addition to these direct labour costs many northern mining companies provide free or low-cost housing, heat, power and water, and in some cases subsidized vacation travel expenses.

Job Classification	Grade	Wage/Salary/Rate (\$'s)
Wage Classes		
Tractor operator	1	3.20/hour
	2	3.05/hour
Shovel operator	1	3.80/hour
	2	3.20/hour
Truck driver	1	3.20/hour
	3	2.80/hour
Driller	1	3.25/hour
	4	2.80/hour
Labourer	—	2.55/hour
Crushing, grinding operator	1	3.05/hour
	3	2.80/hour
Flotation operator	1	3.25/hour
	2	3.05/hour
Heavy duty instrument mechanic	1	3.80/hour
	3	3.20/hour
Welder	1	3.55/hour
	3	3.15/hour
General maintenance	1	3.05/hour
	2	2.80/hour
Electrician	1	3.60/hour
	4	2.70/hour
Sampler	—	2.85/hour
Carpenter	1	3.50/hour
	4	2.70/hour
Janitor	—	2.55/hour

Salary Classes

General Manager	—	1800/month
Resident Manager	—	1500/month
Personnel Officer	—	800/month
Secretaries	1 2	430/month 360/month
Clerk	1 2	430/month 360/month
Accountant	1	550/month
Geologist	1 3	1250/month 675/month
Mine mechanical mill Supt.	—	1150/month
Mine, etc. foreman	—	750/month
Chief engineer	—	1250/month
Mine engineer	—	800/month
Surveyor	—	525/month
Chief metallurgist	—	950/month
Assayer	1 2	650/month 550/month
Purchasing agent	—	750/month
Warehouseman	1 2	600/month 400/month
Medical doctor	—	1700/month
Nurse	—	550/month
Recreation Director	—	750/month

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9B–2.1.1 – LABOUR LEGISLATION

The Yukon Labour Standards Ordinance sets out the following:

- a) Minimum wage \$1.25 per hour.
- b) Hours of work: 8 hours in the day, and 44 hours in the week, for work performed in a shop — that is, an establishment which dispenses goods or services to the public at retail — or 8 hours in the day, and 48 hours in the week, in all other establishments.
- c) Overtime. Overtime may be worked up to a maximum of 10 hours per day for which time and one-half must be paid. Any overtime requirement over a 10-hour day must have special permission from the Labour Standards Office.
- d) General holidays. The Ordinance lists 9 statutory holidays. Any employer requiring an employee to work on any one of these holidays must pay that employee two and one-half times the normal rate of pay. Employees that are not required to work and do not work on these holidays, must be paid straight time.
- e) Annual vacations. The Ordinance sets out an annual vacation for all employees of two weeks at the end of the first and each subsequent year. All employees must be paid 4% of gross pay, including overtime, in lieu of annual vacation, on termination.
- f) Advisory Board. The Ordinance provides for an Advisory Board which may advise the Commissioner on various matters pertaining to labour which have been referred to the Board.

9B-3.1. - UTILITIES

9B-3.1.1 Power

The major power project currently being undertaken is the construction of a power line (138 kv) from Whitehorse to Faro (Anvil townsite) in the Yukon Territory. The Whitehorse power generation (thermal and hydro) capacity is simultaneously being raised to meet the increased demand for power.

A study of the hydro-electric power resources in the central Yukon Territory has recently been completed. Similar studies have recently been commissioned for the Coppermine and southern Great Slave Lake regions of the NWT.

Generally speaking, there is little excess capacity in present Territorial hydro-electric plants. However, the Northern Canada Power Commission, a Crown corporation which plans (and in some cases operates) power generation facilities in Northern Canada has a very flexible policy towards power generation facilities. This was demonstrated in the Taltson River hydro-electric scheme, primarily built to meet the power requirements of Pine Point Mines Ltd., on the south shore of Great Slave Lake. The scheme, with a generating capacity of 18,000 kilowatts, is located on the Taltson River some 35 miles northeast of Fort Smith, NWT. Power is being supplied to Pine Point by means of a 170 mile transmission line (115 kv). At present, Pine Point Mines Ltd. requires 11,000 kilowatts of power, but expansion of the mine/mill operations will require an additional 2,000 kilowatts. At present, then, excess capacity available for new purposes is around 5,000 kilowatts. Recently, the Northern Canada Power Commission stated that preliminary investigations indicated that around 50,000 kilowatts could be generated in the area by extending the present scheme.

Voltage of Territorial power lines varies from 34 kv to 138 kv, the actual voltage depending on transmission load and distance.

Rates for electric power supplied to relatively large industrial users in the Territories range from about 0.6-2.0 cents per kilowatt hour. The actual rate charged depends on location, quantity of power required, transmission distance, and pattern usage.

The following are examples of industrial power costs at various points North of 60.

Location	Rate (¢ per kwh)
Yellowknife, N.W.T.	
(1960 - 4 megawatt capacity)	1.50
(1968 - 20 " ")	0.85
Pine Point, N.W.T.	
(1968 - 25 megawatt capacity)	1.10
(35 " ")	0.90
(50 " ")	0.60
Coppermine, N.W.T.	
(Preliminary investigation)	1.50

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Location	Rate (¢ per kwh)
Frobisher Bay, N.W.T. (Preliminary investigation)	2.75
Anvil, Y.T. (1969 – expected rate)	1.00
Clinton Creek, Y.T. (Preliminary investigation)	1.75

For further information write:

Northern Canada Power Commission
251 Bank Street,
Ottawa, Ontario.

9B-3.1.2 – Fuel Oil

The prime source of electricity and heat North of 60 is fuel oil. When used in small quantities, for heating or diesel electric generating systems, it is normally handled in 45 gallon drums. Transportation of drums in the Territories is expensive, and wherever possible, bulk storage tanks have been constructed where a reasonable quantity of fuel oil is being used.

Under a Regional Price Agreement, the Hudson's Bay Company acts as the retailing distributor, an arrangement which has resulted in cheaper oil in the isolated areas. In addition, individual arrangements have been made with oil companies at other locations to act as agents.

Departmental tanks are located, by region:

Region A	Coppermine Spence Bay
Region B	Eskimo Point Rankin Inlet Whale Cove Baker Lake Chesterfield Inlet Igloolik Coral Harbour
Region C	Sugluk Cape Dorset
Region D	Pond Inlet Pangnirtung

Fuel oil in the Yukon is supplied to Whitehorse from Pacific tidewater at Skagway through a four-inch pipeline, and from Whitehorse to other Yukon points by tank truck. The pipeline and trucking operations are controlled by the White Pass and Yukon Railway.

In the Mackenzie District of the Northwest Territories, the main supply is from the Imperial Oil refinery at Norman Wells. Oil from Norman Wells is transported almost entirely by barge along the Mackenzie River system, and by freighters along the Arctic Coast during the summer season. The Great Slave Lake region is supplied mainly by truck and rail service from Edmonton. Fuel oil and other petroleum for the Keewatin District and the eastern and northern Arctic Islands come from Venezuela.

Examples of fuel oil prices at various points, for industrial users (¢ per Imperial gallon):

Frobisher Bay, NWT	25¢
Yellowknife, NWT	30¢
Whitehorse, YT	25¢
Dawson, YT	35¢

Heavy fuel oil is available from Norman Wells. It has been estimated that this grade of oil could be supplied to points on Great Slave Lake at about 16¢ per gallon.

9B-3.1.3 – Gasolines and Gas

Distribution of gasoline and gas (natural or liquefied petroleum) follows a similar pattern to fuel oil.

In the Yukon, the products are carried to Whitehorse by the White Pass and Yukon Railway, and by truck from Whitehorse.

In the Northwest Territories, the Mackenzie District is supplied by Norman Wells. Eastern seaboard refineries supply the Keewatin District and the Arctic Islands.

Examples of gasoline prices for industrial consumers (¢ per Imperial gallon):

Frobisher Bay, NWT	47¢
Yellowknife, NWT	50¢
Whitehorse, YT	50¢
Dawson, YT	60¢

While natural gas has been discovered North of 60, as yet there are no natural gas pipelines supplying Territorial points. However, recent studies have indicated the wellhead price for natural gas at southern Territorial wells would average 12-16¢ per 1,000 cubic feet. If this gas were transported by pipeline 200 miles, the cost would average 10¢ per 1,000 cubic feet (20,000,000 cubic feet per day) to 25¢ per 1,000 cubic feet (5,000,000 cubic feet per day).

TABLE 9B-1
Commercial Energy Producing Installations
In the Yukon and Northwest Territories

Location	Agency	Type	Installed Capacity
Yukon			
Whitehorse	Y.E.C.L. ^{1.}	Hydro	1,650 Kw
Whitehorse	N.C.P.C. ^{2.}	Hydro	19,000 Kw
Whitehorse	N.C.P.C. ^{2.}	Thermal	9,000 Kw
Mayo	N.C.P.C. ^{2.}	Hydro	4,500 Kw
Dawson	N.C.P.C. ^{2.}	Thermal	750 Kw
Watson Lake	Y.E.C.L.	Thermal	1,480 Kw ³
Carmacks	Y.E.C.L.	Thermal	450 Kw
Destruction Bay	Y.E.C.L.	Thermal	500 Kw
Haines Junction	Y.E.C.L.	Thermal	400 Kw
Teslin	Y.E.C.L.	Thermal	500 Kw
Beaver Creek	Y.E.C.L.	Thermal	310 Kw
Swift River	Y.E.C.L.	Thermal	200 Kw
Ross River	Y.E.C.L.	Thermal	260 Kw
Old Crow	Y.E.C.L.	Thermal	150 Kw
Stewart Crossing	Y.E.C.L.	Thermal	100 Kw
Pelly River	Y.E.C.L.	Thermal	100 Kw
NWT			
Hay River	N.U. ⁴	Thermal	2,475 Kw
Enterprise	N.U.	Thermal	150 Kw
Fort Providence	N.U.	Thermal	150 Kw
Yellowknife	N.C.P.C.	Hydro	13,000 Kw
Fort Smith	N.C.P.C.	Thermal	2,250 Kw ^{5.}
Fort Simpson	N.C.P.C.	Thermal	1,100 Kw
Inuvik	N.C.P.C.	Thermal	4,500 Kw
Fort McPherson	N.C.P.C.	Thermal	750 Kw
Fort Resolution	N.C.P.C.	Thermal	325 Kw
Frobisher Bay	N.C.P.C.	Thermal	4,000 Kw
Aklavik	N.C.P.C.	Thermal	470 Kw

TABLE 9B-1 continued

Location	Agency	Type	Installed Capacity
NWT (cont'd)			
Taltson	N.C.P.C.	Hydro	18,000 Kw6.
Coppermine	N.C.P.C.	Thermal	600 Kw
1. Yukon Electrical Co. Ltd.			
2. Northern Canada Power Commission			
3. Will probably be connected to the 138 Kw. Anvil line in the near future.			
4. Northland Utilities Ltd.			
5. Standby plant only. Fort Smith receives power from the Taltson River hydro plant.			
6. The Taltson hydro plant supplies power to Fort Smith, Pine Point Mines Ltd., and the town of Pine Point.			

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TERRITORIAL GOVERNMENT

9C-1.1 – GENERAL

The evolution of government in the Yukon and the Northwest Territories continues to keep pace with the economic development of the two regions. As the population grows, as the indigenous peoples assume greater responsibilities in their communities, and as economic development brings greater prosperity and opportunities, the degree of local participation increases. The Federal Government has overriding jurisdiction North of 60 and is sponsoring a gradual transition from Federal to Territorial government responsibility and administration.

The Territorial Governments are unique in many ways. In both Territories, the Commissioner is appointed by the Federal Government, the control of certain government fields is retained by the Federal Government, and the Federal Government still holds considerable control over Territorial legislation and meets the bulk of the cost of these northern governments.

A main area in which direct control has been retained by the Federal Government is the field of natural resources. Exceptions in the case of natural resources are found in game and land surrounding communities and settlements which are under the jurisdiction of the Territorial Governments.

Under the division of responsibilities between the Federal and Territorial Governments, most of the Territorial ordinances are administered by the Territorial public services of the Yukon and increasingly so in the Northwest Territories. Some are administered by agencies of the Federal Government.

Federal administration covers such fields as Public Health Ordinances and Regulations, the Mining Safety Ordinance and the Blasting Ordinance. Also, the Minister of Justice for Canada is the Attorney General of the two Territories and the responsibility for the administration of justice remains in Federal hands. The Federal Government also administers its own legislation with respect to the resource field.

9C-1.1.1. – Advisory Committee on Northern Development

The Advisory Committee on Northern Development was established by the Federal Government to consider and report periodically on all phases of development of the Canadian North. The reports of the Committee cover the operations of all the various Federal Government departments, agencies and Crown corporations active in the Territories. The Committee also outlines future plans. Copies of the Committee reports may be obtained from:

Advisory Committee on Northern Development,
Centennial Tower Building,
400 Laurier Ave. W.,
Ottawa 4, Ontario,
Canada.

9C–1.1.1

Committee membership includes the following senior government officers:

The Deputy Minister of Indian Affairs
and Northern Development (Chairman)
Deputy Minister of Agriculture
Deputy Minister of Supply and Services
Deputy Minister of National Defence
Chief of the Defence Staff
Chairman, Defence Research Board
Deputy Minister of Energy, Mines and Resources
Under-Secretary of State for External Affairs
Deputy Minister of Public Works
Deputy Minister of Finance
Deputy Minister of Fisheries and Forestry
Deputy Minister of Manpower and Immigration
Deputy Minister of National Health and Welfare
President, National Research Council
Clerk of the Privy Council and Secretary to the Cabinet
Commissioner, Royal Canadian Mounted Police
Deputy Minister of Transport
Secretary of the Treasury Board
Deputy Minister of Communications
Chief Science Adviser to the Cabinet
Commissioner of the Yukon Territory
Commissioner of the Northwest Territories
The Secretary, Advisory Committee on Northern Development

In addition, four permanent sub-committees function under the direction of the main Committee. These are:

Co-ordinating Sub-Committee
Transportation Sub-Committee
Scientific Research Sub-Committee
Communications Sub-Committee

9C–1.1.2 – Territorial Representation

Both the Yukon and Northwest Territories send one elected representative to the Federal Parliament in Ottawa.

9C–1.1.3 – Local Government

The development of local governments is actively encouraged in both Territories and, in both Territories, specific departments have been established to foster, encourage, and assist in this matter. Some communities already have a well-established local government responsible for the normal operation and systematic development of their areas.

9C-2.1 – THE YUKON TERRITORY

The basic legislation providing for the Government of the Yukon Territory is the Yukon Act. It provides for a Commissioner to administer the government of the Territory under instructions issued from time to time by the Governor in Council or the Minister of Indian Affairs and Northern Development. In 1970 an Executive Committee was established consisting of the Commissioner, the two Assistant Commissioners and two members of the Territorial Council chosen by the Council. In addition to their responsibilities as members of the Executive Committee the two elected representatives administer certain Departments of the Territorial Government.

The Legislative Council of the Yukon consists of seven members elected from constituencies throughout the Territory. The Members are elected for a four-year term of office unless the Council is previously dissolved by the Governor in Council (Federal Cabinet). The Council is presided over by one of its own members who is chosen as Speaker at the beginning of each four-year term.

The legislative powers of the Commissioner in Council are roughly analogous to those of a provincial Legislative Assembly. Under the terms of the Yukon Act, these powers include legislation in the following fields of jurisdiction.

- Direct taxation
- Territorial offices and municipal institutions
- Election of the members of the Council
- Occupation or Business licences
- Company incorporation
- Marriage laws
- Property and civil rights
- Administration of justice
- Game laws
- Education
- Control of intoxicants
- Hospitals
- Welfare
- Agriculture
- Expenditures from the Yukon Consolidated Revenue Fund
- Fines, penalties, imprisonment
- Other local and/or private matters within the terms of the Act

Legislation passed by the Council may be disallowed by the Governor in Council within one year of its passage. Unlike the situation in the provinces the legislative powers of the Council are derived from the Parliament of Canada and may be changed from time to time.

9C–2.1.1

9C–2.1.1 – Public Service

The Public Service of the Yukon is separate and distinct from the Federal Public Service. It is divided into major departments with the following general areas of responsibility:

Administrative Services:

- Personnel
- Central Purchasing and Inventory Control
- Central Registry
- Legal
- Housing and Accommodations
- General Printing and Stationery

Financial and Accounting Services:

- Accounting
- Estimates
- Payroll
- Revenue
- Expenditures
- Internal Audit
- Budget Control
- Hospital Insurance

Territorial Secretary:

- Enforcement of ordinances
- Public Administrator
- Liquor
- Labour
- Registrar of Companies
- Inspection

Engineering and Municipal Services:

- Administration
- Mechanical
- Vehicle and Equipment Pool
- Road Maintenance
- Buildings
- Projects
- Municipal Affairs
- Assessments

Education and Vocational Training:

- Primary Schools
- Secondary Schools
- Vocational and Technical Schools
- Administration

Welfare and Rehabilitation:

Welfare
Correction
Probation

Health Services:

Public Health Services
Northern Health Services

Conservation and Recreation:

Game Ordinances
Library Services
Travel and Publicity
Fitness and Amateur Sport

The Territorial department heads are individually responsible for the administration of their department to the Commissioner.

9C-3.1 – NORTHWEST TERRITORIES

The Northwest Territories Act establishes and outlines the scope and powers of the Commissioner and the Legislative Council. In 1966 the Report of the Advisory Commission on the Development of Government in the Northwest Territories made recommendations for the development of government for the next ten years. Subsequently, the Federal Government implemented a number of the recommendations and established a series of Task Forces to study ways of implementing other recommendations.

Yellowknife was named the seat of government of the Northwest Territories in 1967 and Territorial Government employees began arriving in the town before the end of the year to commence taking over their duties. A Public Service for the Northwest Territories was established and the target date for the transfer to the Territorial Government of various programs, including education and welfare, was set for April 1, 1969 for the Mackenzie District and April 1, 1970 for the Eastern Arctic.

The Northwest Territories Act provided partial representative government but not responsible government for the Territories. Executive authority is placed in the Commissioner who is appointed by, and who is responsible to, the Federal Government. The Legislative Council is composed of ten elected and four appointed members. The elected members represent the constituencies throughout the whole of the Territories and the Commissioner presides over the Council in session. All Council Members serve for a term of three years. Like the Yukon Act, the Northwest Territories Act provides a wide range of legislative power to the Commissioner in Council. It established a full system of courts and authorizes a Northwest Territories Consolidated Revenue Fund.

9C-3.1.1 – The Public Service

The expanding Territorial Government is based upon seven major departments with supporting information, legal advisory, personnel, and management audit services. The major departments, along with their main responsibilities are:

Local Government:

Municipal Ordinance
Fostering, encouraging and assisting in the development of local government

Industry and Development:

Promoting and assisting industrial development, tourism, game administration

Department of Social Development:

Corrections Service
Family Services and Child Welfare
Rehabilitation and Medical Services
Alcohol Education

Department of Education:

School Services
Adult Education
Curriculum Development

Territorial Treasury:

Accounting, financial and treasury functions of the Territorial Government
Liquor

Territorial Secretary:

Council Secretariat
Provides services of an administrative and technical nature to all elements of the headquarters organization.
Licensing

Department of Public Works:

All aspects of public works operations including design, construction and maintenance of roads, buildings and municipal-type services.

9C-4.1 – GOVERNMENT SERVICES

9C-4.1.1 – Housing

The type, size and number of houses provided in a community often has a far-reaching effect on the social and economic development of that community. For this reason all levels of government concern themselves with housing North of 60. In particular, the Territorial Governments are taking an increasingly active part in the development of housing in their regions.

The Central Mortgage and Housing Corporation (CMHC) is a Crown agency and, as such, is responsible for the administration of the National Housing Act and co-ordination of the activities of the Federal Government in the housing for all of Canada. The present National Housing Act is defined as an act “to promote the construction of new houses, the repair and modernization of existing houses and the improvement of housing and living conditions”. The Corporation has the authority and responsibility for a variety of functions affecting housing in both the long term and the immediate future. It is empowered to act as an insurer of mortgage loans, as a lender or investor of public funds, as a guarantor and as an owner of property and other assets. It also acts as a research agency in fields associated with housing and assists provinces, the Yukon and Northwest Territories and municipalities in many aspects of urban growth.

In general, the Federal Government, through the successive housing acts, has attempted to stimulate and supplement the market for housing rather than assume direct responsibilities that rightfully belong to other levels of government or that could be borne more effectively by private enterprise. In each case the aim has been to increase the flow of mortgage money and to encourage lenders to make loans on more favourable terms to home owners.

A second mortgage plan has been introduced by the governments of the Yukon and Northwest Territories as a supplement to amounts available under the National Housing Act. This plan is designed to assist those who qualify for a first mortgage under the Act but because of the higher costs of construction in the North, need additional assistance. This program is administered by CMHC on behalf of the Territorial Governments.

In the Yukon, CMHC has established an office in Whitehorse to improve its lending facilities and provide a more direct advisory service to the Territorial Government. Regular consideration of housing problems and needs in the Yukon is given by joint meetings of the Territorial Government with representatives of the Department of Indian Affairs and Northern Development and officials of CMHC.

Both the governments of the Yukon and the Northwest Territories provide first mortgage loans for residents constructing low-cost houses. In addition, the mortgagee under this program may be given a second mortgage which is forgivable over a period of ten years.

Recent legislation in the Northwest Territories has been enacted by the Territorial Government in the form of the Housing Development Ordinance which complements the National Housing Act and which is intended “to promote the improvement of housing and living conditions in the Northwest Territories”. The Ordinance provides for the Commissioner or a municipality with the approval of the Commissioner to enter into agreements with CMHC to undertake and operate public housing projects, to acquire and develop land for housing purposes, to prepare and implement urban renewal schemes, to undertake student housing projects and to construct sewage treatment projects. As a result of the legislation the Territorial Government has requested CMHC to participate in public housing, land assembly, urban renewal projects as well as construction of rental housing in Yellowknife, Hay River, Inuvik and Fort Smith. CMHC has opened an office in Yellowknife.

Special assistance programs in the form of low-rental housing have been introduced by the Federal Government and by the Government of the Northwest Territories to deal with the housing needs of the low income indigenous families.

The Territorial Governments are actively interested in the growth of the North and recognize that an economy cannot develop properly unless it is accompanied by reasonably permanent settlements. This goal can never be obtained without adequate housing. The housing programs in effect at present have been introduced in the belief that they will assist economic growth both by providing a fund to finance home ownership and by supplying low-rental accommodation to those people not able to purchase housing and by encouraging the use of local resources wherever feasible.

9C-4.1.2 – Health

Because of the special problems in developing health services North of 60, the Department of National Health and Welfare has been given the responsibility of co-ordinating federal and territorial health care for all residents. In this role the Department assists the Territorial Governments in providing public health services. Health facilities range from modern hospitals to lay dispensaries operated by a trader, policeman or missionary at some very remote settlements. Although there are several doctors in private practice, along with Territorial, community and church operated hospitals in some settlements, most facilities and staff elsewhere in the Yukon and Northwest Territories are supplied by the Northern Health Service of the Department. The object of both the Federal and Territorial Governments is to ensure that medical and other health services, comparable to those in other parts of Canada, are available to residents North of 60.

The overall problem of health service in the North is to provide health care with a limited number of staff to comparatively small groups of people scattered over more than 1,000,000 square miles.

9C-4.1.3 – Welfare

The programs of social welfare in effect North of 60 are aimed at making available social welfare benefits which not only reflect the special needs of the northern people but at the same time are comparable in scope and quality to those available in southern Canada. Northern Canadians receive aid in the same manner and same amounts as other residents of Canada under federal programs such as family allowances, old age security, old age assistance and blind and disabled persons' allowances. In addition, there are programs for neglected children, homes for the aged, medical social services especially for problems relating to the hospitalization of Indians and Eskimos and a social assistance program providing food, clothing and shelter to those who are in temporary financial distress.

Community Welfare Services constitute a series of programs designed to assist communities and groups rather than individuals in meeting the type of complex problem mentioned above.

The Community Development Fund, a means of stimulating community initiative and reducing local unemployment, has enabled a number of communities to undertake a variety of useful projects that originate locally and are carried out under local responsibility.

9C—4.1.3

These include projects such as community bath houses and renovations to community halls. A comprehensive corrections program has been developed and it includes the construction of territorial prisons, minimum security camps and juvenile detention units. The program makes extensive use of probation as well as after-care service and incorporates the most advanced principles of corrections to achieve maximum rehabilitation of prisoners.

9C—4.1.4 — Education

The school system in the Yukon is operated by the Territorial Government through a superintendent or director and staff responsible to the Commissioner. With the exception of three school districts in the Northwest Territories, all schools are government owned. Wherever possible, classrooms and teachers are provided locally to meet community education needs but because of distance and small populations this arrangement is not always possible. Pupil residence facilities have been established at larger centers (mainly in the Northwest Territories for secondary or vocational pupils) to accommodate students from distant points.

An extensive system of special education programs has been set up to meet the needs of the local people. They include vocational and apprenticeship training programs in addition to normal primary and secondary schooling. Also, adult education is available to provide the educational training and guidance which adults require to face the complex social, economic and cultural problems they encounter in their rapidly changing environment. Where necessary, North of 60 residents may be sent to educational institutions in the provinces, if appropriate training courses are not available in the North.

University level education facilities are not available in the Territories but attendance may be arranged for, and financial assistance provided to, individuals meeting the entrance prerequisites of Canadian universities.

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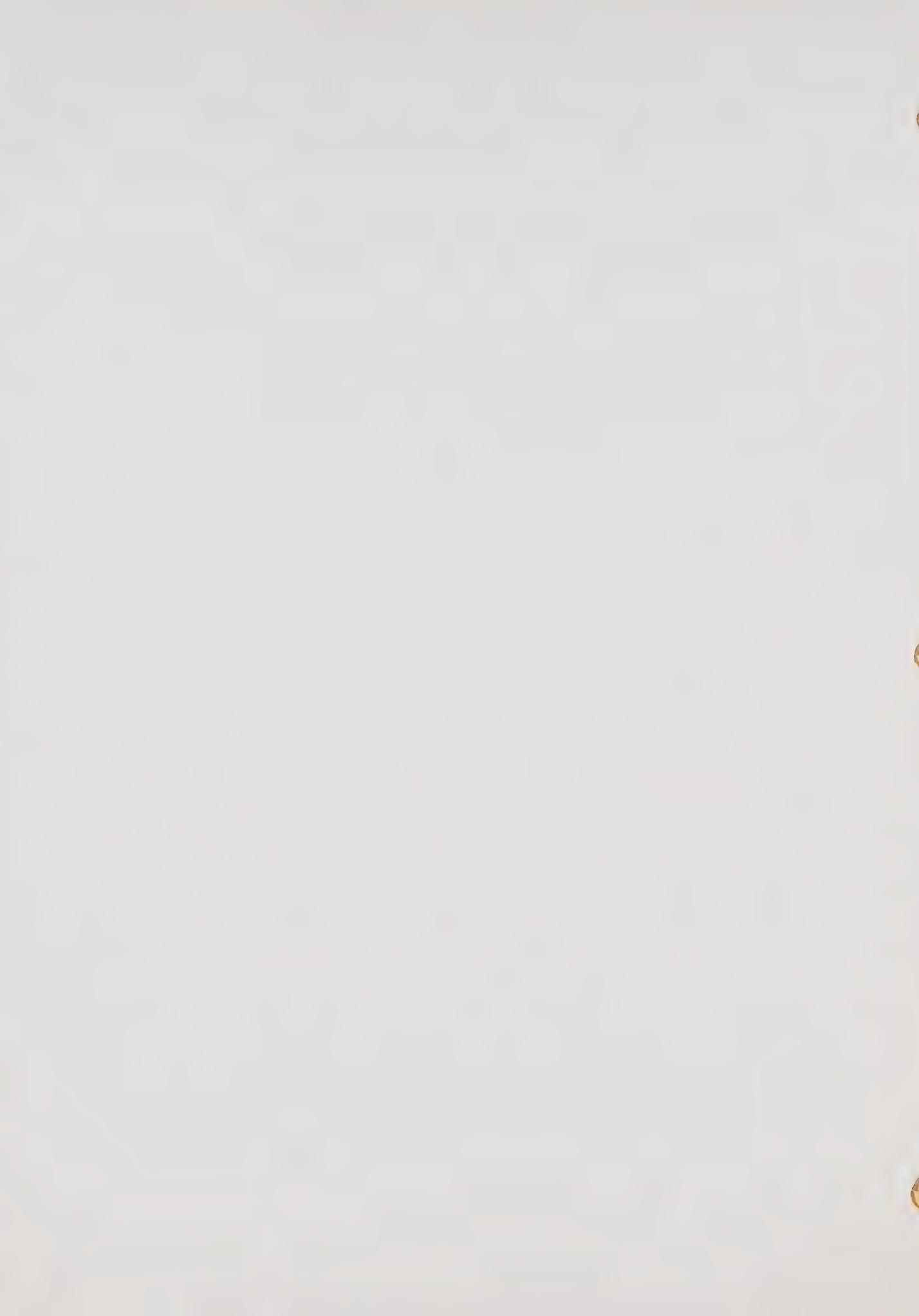
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Map

9D-1 Centres of Population of 200 and Over

Table

9D-1 Population of Communities of 50 Persons and Over, 1961 and 1966



MUNICIPALITIES

9D-1.1 – YUKON

The main communities of the Yukon Territory:

9D-1.1.1 – Whitehorse

Population:	City 4,771. Metropolitan area 9,000. (1966 census)
Location:	On Yukon River, 900 miles northwest of Vancouver, B.C., 390 miles south of Arctic Circle.
Municipal Status:	Capital of the Yukon Territory. Governed by elected council composed of mayor and four councillors.
Federal Agencies:	Department of Transport. Yukon RCMP headquarters. Office of Mining Recorder, Whitehorse district.
Services:	Fire department. Police. Hospital (120 beds).
Utilities:	Power -- Yukon Electrical Company, Northern Canada Power Commission. Water -- City of Whitehorse. Sewerage -- City of Whitehorse.
Schools:	Vocational and technical training centre, primary, high and separate schools.
Churches:	Anglican Church of Canada. Roman Catholic Church.
Transportation:	Rail -- White Pass and Yukon Route to Skagway, Alaska. Air -- Modern airport capable of handling jet transports, Radio range, meteorological stations. Scheduled airlines to Seattle, Vancouver, Edmonton, Fairbanks. Road -- Alaska Highway to southern Canada and Alaska. Water -- Local water transport on Yukon River.
Communications:	Mail, telephone, telegraph, radio and television facilities. Newspapers, "Yukon Daily News", Whitehorse Star Weekly".
Public Facilities:	Community centre, hotels, motels, banks, theatre, stores, and other community facilities.

9D–1.1.2

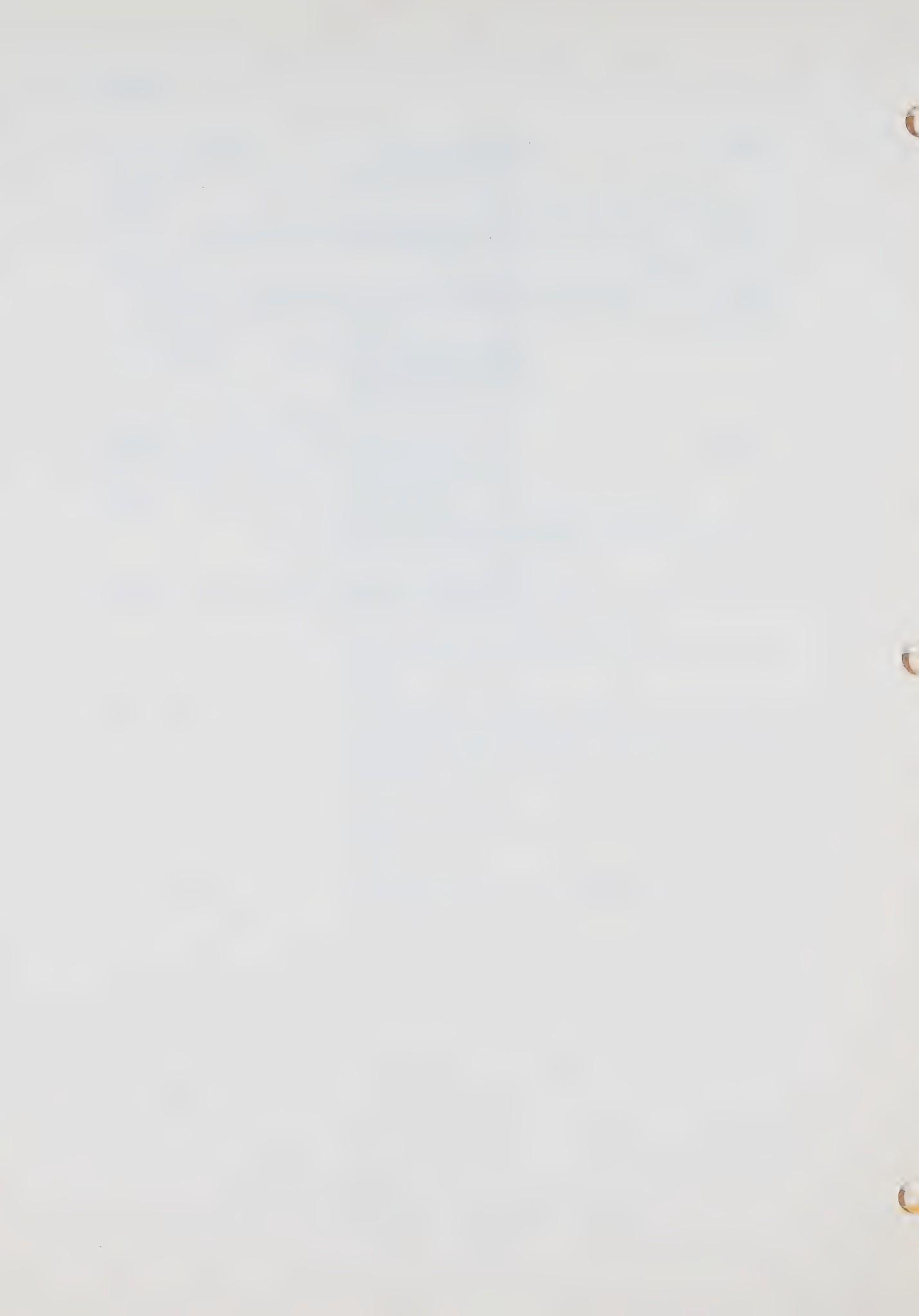
9D–1.1.2 – Dawson

Population:	742 (1966).
Location:	On the Yukon and Klondike Rivers, 388 road miles northwest of Whitehorse.
Municipal Status:	An incorporated municipality governed by an elected council composed of mayor and three councillors.
Federal Agencies:	Department of Transport. Mining Recorders Office. Forestry Office. RCMP.
Services:	Nursing station. Home for retired miners.
Utilities:	Power – Northern Canada Power Commission. Water – Northern Canada Power Commission. Sewerage – Municipality of Dawson.
Schools:	Public elementary and high school. Roman Catholic elementary and high school.
Churches:	Anglican, Roman Catholic, Pentecostal Tabernacle, Jehovah Witness.
Transportation:	Scheduled flights to and from Whitehorse. Regular bus service to and from Whitehorse. Sixty Mile Road open during summer months only between Dawson and Alaskan border. Local water transport.
Communications:	Regular mail, telephone, telegraph, radio services, weekly newspaper.
Public Facilities:	Hotels, motels, stores, banks, restaurants, historic Palace Grand Theatre restored as National Historic Site.

9D–1.1.3 – Watson Lake

Population:	735 (1966).
Location:	220 miles southeast of Whitehorse.
Municipal Status:	Local improvement district.
Federal Agencies:	Department of Transport. Yukon Forest Service. Mining Recorders Office. RCMP. Department of National Health and Welfare.

Services:	Hospital (10 beds). Fire department. Police.
Utilities:	Power — Northern Canada Power Commission. Sewer system.
Schools:	Elementary and secondary public schools.
Churches:	Anglican Church of Canada. Roman Catholic Church. Pentecostal Tabernacle. Baptist Church.
Transportation:	Air — Scheduled airline services to Whitehorse, Edmonton, Vancouver. Road — Alaska Highway connections to Edmonton, White- horse, B.C. interior.
Communications:	Telephone, telegraph, radio facilities.
Public Facilities:	Hotels, motels, restaurants, theatre, and other community services.



9D-2.1 – NORTHWEST TERRITORIES**9D-2.1.1 – Yellowknife**

Population:	3,741 (1966).
Location:	On west shore of Yellowknife Bay, Great Slave Lake.
Municipal Status:	Capital of the Northwest Territories. Government by council composed of mayor and eight councillors.
Federal Agencies:	<p>Department of Indian Affairs and Northern Development.</p> <p>Department of Energy, Mines and Resources.</p> <p>Department of Justice.</p> <p>Department of Manpower and Immigration – Canada Manpower Centre.</p> <p>Department of National Health and Welfare.</p> <p>Department of Public Works.</p> <p>Department of Transport.</p>
Services:	<p>Fire department.</p> <p>Police.</p> <p>Hospital (43 beds).</p>
Utilities:	<p>Power – Northern Canada Power Commission.</p> <p>Water – Town of Yellowknife.</p> <p>Sewerage – Town of Yellowknife.</p>
Schools:	<p>Public and separate elementary and high schools.</p> <p>Composite academic-vocational school operated by Department of Indian Affairs and Northern Development.</p>
Churches:	<p>Anglican Church of Canada.</p> <p>United Church of Canada.</p> <p>Roman Catholic Church.</p> <p>Baptist Church.</p> <p>Pentecostal Tabernacle,</p> <p>Bahai World Faith</p>
Transportation:	<p>Air – Modern airport. Scheduled flights to Edmonton, points north, Churchill, Winnipeg.</p> <p>Road – Yellowknife highway to southern Canada. Regular bus service to Edmonton.</p> <p>Water – Lake transport service.</p>
Communications:	<p>Regular mail, telephone, telegraph, radio and television services.</p> <p>Newspaper, "News of the North"</p>
Public Facilities:	Hotels, banks, stores, theatres, golf course, and other community facilities.

9D-2.1.2

9D-2.1.2 – Inuvik

Population:	3000 (1966).
Location:	East channel of the Mackenzie River Delta, 60 miles south of Beaufort Sea and 125 miles north of Arctic Circle.
Municipal Status:	Village.
Federal Agencies:	<p>Department of Indian Affairs and Northern Development (Northern Administration Branch, Indian Affairs Branch, Canadian Wildlife Service, Northern Coordination and Research Centre.)</p> <p>Department of National Defence.</p> <p>Department of National Health and Welfare.</p> <p>Department of Public Works.</p> <p>Department of Transport.</p> <p>RCMP.</p>
Services:	<p>Fire department.</p> <p>Hospital (100 beds).</p> <p>Police.</p>
Utilities:	Power, water, heat provided by Northern Canada Power Commission.
Schools:	Elementary and secondary schools operated by Department of Indian Affairs and Northern Development.
Churches:	<p>Anglican Church of Canada.</p> <p>Roman Catholic Church.</p> <p>Pentecostal Inuvik Christian Assembly.</p> <p>Church of Latter Day Saints.</p>
Transportation:	<p>Air – modern airport. Scheduled flights to Edmonton and intermediate stops. Non-Scheduled flights to Yukon and Arctic points.</p> <p>Water – Barge service along Mackenzie River waterway.</p> <p>Road – 25 miles of local roads.</p>
Communications:	Mail, telephone, telegraph, radio facilities. Weekly newspaper, "The Drum," printed in English, Eskimo and Indian.
Public Facilities:	Hotels, stores, banks, restaurants, laundry and dry-cleaning establishment operated by Department of Indian Affairs and Northern Development, and other community services.

9D-2.1.3 – Fort Smith

Population:	2,200 (1966).
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Location:	On west bank of Slave River, one mile north Alberta — NWT border, 450 miles north of Edmonton.
Municipal Status:	Town
Federal Agencies:	Department of Indian Affairs and Northern Development. Department of Transport. District Treasury Office, Department of Finance. Department of National Health and Welfare. Department of Public Works. RCMP.
Services:	Fire department. Hospital. Clinic. Police.
Utilities:	Power — Northern Canada Power Commission. Water — Town of Fort Smith. Sewerage — Town of Fort Smith.
Schools:	Public elementary and high school. Grandin College for promising older students.
Churches:	Roman Catholic Church. Site of Roman Catholic Mission and seat of the Roman Catholic Vicariate Apostolic of Mackenzie. Anglican Church of Canada. Pentecostal Tabernacle. Baptist Church.
Transportation:	Air — regular scheduled flights to Yellowknife, Edmonton, Uranium City, Prince Albert, Sask. Road — Highway connections to Pine Point, Hay River and Mackenzie Highway system. Water — Trans-shipment centre on Mackenzie River system.
Communications:	Mail, telephone, telegraph, radio facilities. Weekly newspaper, "The Norther."
Public Facilities:	Hotels, banks, stores, community centre, library, golf course, skiing.

9D-2.1.4 — Hay River

Population:	2004 (1966)
Location:	At mouth of Hay River on south shore of Great Slave Lake.
Municipal Status:	Town

9D-2.1.4

Federal Agencies:	Department of Indian Affairs and Northern Development. Department of Public Works. Department of Fisheries. Department of Transport. RCMP.
Services:	Fire department. Hospital. Health Centre. Police.
Utilities:	Power — Northland Utilities Limited. Water, sewerage, garbage collection.
Schools:	Public and separate elementary and high schools.
Churches:	Anglican Mission Roman Catholic Mission. United Church of Canada. Pentecostal Chapel.
Transportation:	Air — regular service to Edmonton, Yellowknife, Peace River, Fort Smith. Road — Mackenzie Highway to southern Canada and Yellow- knife. Regular bus service. Rail — Northern terminus of Great Slave Lake Railway. Water — Great Slave Lake and Mackenzie River transport service.
Communications:	Mail, telephone, telegraph, radio facilities. Weekly newspapers, “TAPWE”, “Hay River News”.
Public Facilities:	Hotels, restaurants, banks, and other community facilities, arena, tourist camps.

9D-2.1.5 — Frobisher Bay

Population:	1,651 (1966).
Location:	At head of Frobisher Bay on southeast corner of Baffin Island.
Municipal Status:	Unincorporated.
Federal Agencies:	Regional headquarters, Department of Indian Affairs and Northern Development. Eastern Arctic sub-division headquarters, RCMP. Department of Transport.
Services:	Hospital (30 beds). Police.

Utilities:	Power — Northern Canada Power Commission diesel electric plant. Water delivery, sewerage, garbage services under contract by Department of Indian Affairs and Northern Development.
Schools:	Federal day school.
Churches:	Anglican mission. Roman Catholic mission.
Transportation:	Air — modern airport. Scheduled service to Montreal and Arctic points. Water — major Arctic resupply base.
Communications:	Mail, telephone, telegraph, radio facilities.
Public Facilities:	Store, bank, local transportation facilities, theatre.

9D-2.1.6 – Baker Lake

Population:	596 (1966)
Location:	200 miles inland from west coast of Hudson Bay, Latitude 64°N, Longitude 96°W.
Municipal Status:	Unincorporated.
Federal Agencies:	Department of Indian Affairs and Northern Development. Department of Transport. RCMP Keewatin sub-division. Department of National Health and Welfare. National Research Council.
Services:	Nursing station (3 beds and clinic).
Utilities:	Local services provided.
Schools:	Federal day school.
Churches:	Roman Catholic Mission. Anglican Mission.
Transportation:	Air — scheduled service to Churchill and points north. Water — summer lake freight service.
Communications:	Mail, telephone, radio-telephone service.
Public Facilities:	Hudson's Bay Company northern store.

9D-2.1.7

9D-2.1.7 – Cambridge Bay

Population:	511 (1966).
Location:	On southeast tip of Victoria Island, 1150 miles northeast of Edmonton.
Municipal Status:	Unincorporated.
Federal Agencies:	Department of Indian Affairs and Northern Development. Department of Transport. RCMP.
Services:	Department of National Health and Welfare nursing station. Police.
Utilities:	Water, sewage and garbage disposal provided under contract.
Schools:	Federal school and hostel.
Churches:	Anglican Church of Canada. Roman Catholic Church.
Transportation:	Air — Scheduled airline service from Yellowknife, Edmonton. Water — Summer sea lift service.
Communications:	Telephone, radio.
Public Facilities:	Hotel, supermarket, theatre, library, curling rink, social club.

TABLE 9D-1
Population of Yukon Communities
of 50 persons and over, 1961 and 1966

Unincorporated Places of 50 persons and over

Yukon Territory	1966	1961
Old Crow Village	218	217
Bear Creek	87	138
Calumet	198	377
Dominion	...	76
Elsa	529	395
Keno Hill	144	156
Pelly Crossing	137	151
Sulphur	...	52
Aishihik	19	61
Beaver Creek	114	96
Burwash Landing	69	57
Carmacks	311	218
Champagne	28	56
Destruction Bay	64	104
Haines Junction	195	199
Swift River	40	50
Upper Liard	148	199
Watson Lake	631	597
Carcross	199	175
Crestview Subdivision	162	...
Porter Creek	489	...
Ross River	173	132
Teslin	324	231
Total Unincorporated of 50 persons & over	4,279	3,737
Total Unincorporated of less 50 persons	763	976
Unorganized	3,348	3,561

TABLE 9D-1 continued

Yukon Territory	1966	1961
Cities		
Dawson	742	881
Whitehorse	4,771	5,031
Towns		
Mayo	479	342
Grand Total Yukon Territory	14,382	14,628

(...) not shown separately

Source: D.B.S. Census of Canada 1961, 1966.

TABLE 9D-1 continued

Unincorporated Places of 50 persons and over

Northwest Territories	1966	1961
Cape Dorset	357	161
Port Burwell	105	36
Mould Bay	56	...
Cambridge Bay	511	531
Perry River	71	14
Holman Island	179	98
Read Island	...	75
Sachs Harbour	132	76
Eskimo Point	464	168
Whale Cove	181	125
Baker Lake	596	386
Chesterfield Inlet	199	146
Daly Bay	59	...
Rankin Inlet	429	585
Coral Harbour	298	117
Pelly Bay	171	94
Spence Bay	247	124
Belcher Islands	178	169
Bathurst Inlet	73	23
Fort Resolution	677	485
Pine Point	459	1
Rocher River	38	58
Discovery Mines	159	203
Lac La Martre	125	121
Marian Lake Village	43	82

TABLE 9D-1 continued

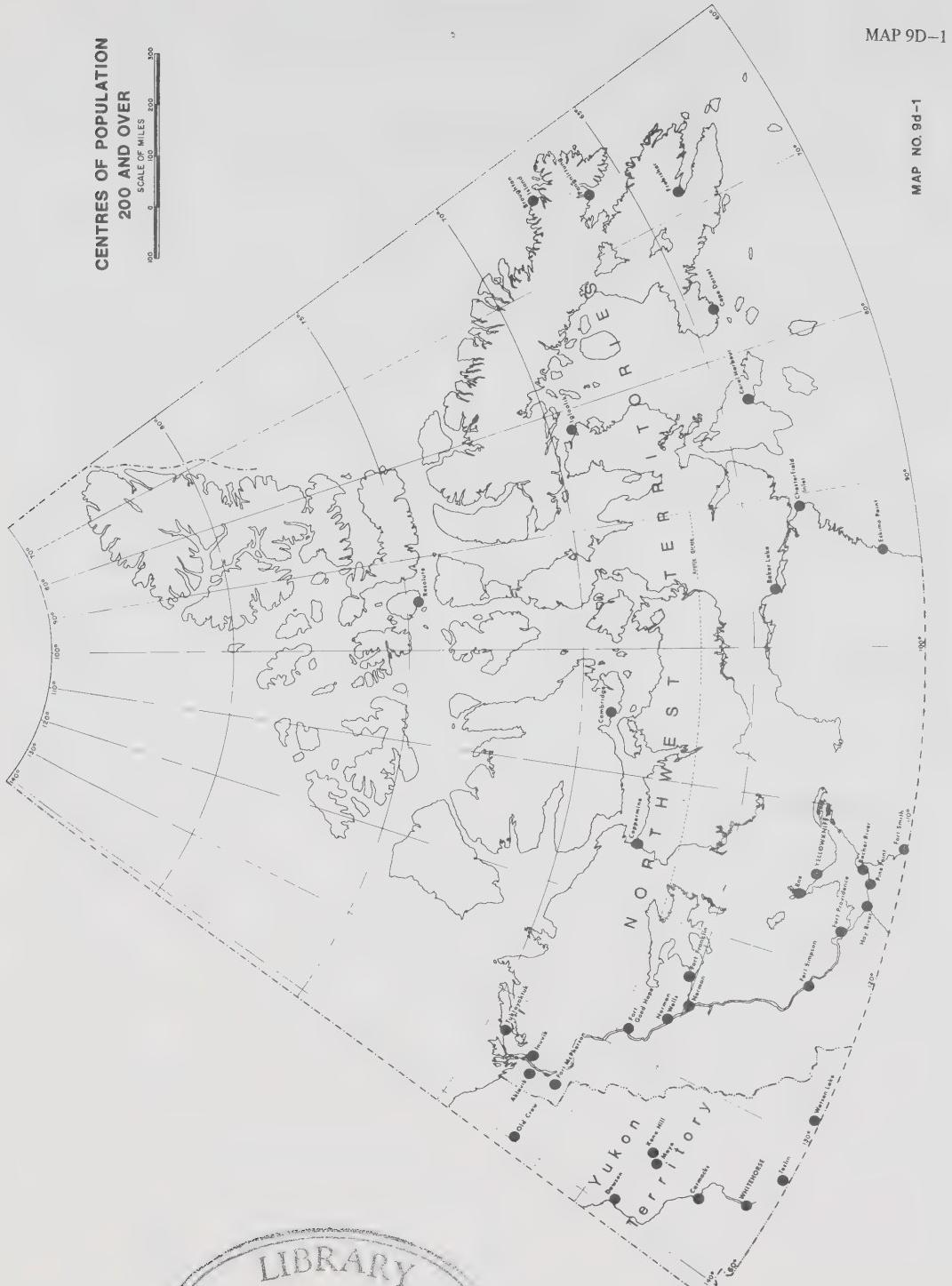
Unincorporated Places of 50 persons and over

Northwest Territories	1966	1961
Rae	779	522
Rae Lake	53	...
Shoti Lake Camp	...	52
Snare Lake	56	...
Snowdrift	176	140
Tundra Mine	65	...
Trout Rock	...	107
Contowoyo Lake	13	53
Coppermine	536	230
Cape Parry	50	214
Tuktoyaktuk	512	409
Aklavik	611	599
Reindeer Depot	76	77
Arctic Red River	86	87
Fort McPherson	654	509
Colville Lake	67	57
Fort Good Hope	335	292
Fort Franklin	311	238
Fort Norman	216	189
Norman Wells	199	297
Fort Liard	177	154
Jean Marie River	51	44
Nahanni Butte	71	76
Tungsten	198	...

CENTRES OF POPULATION

200 AND OVER

SCALE OF MILES
0 100 200 300



MAP 9d-1

MAP NO. 9d-1





TABLE 9D-1 continued
Population of Northwest Territories Communities
of 50 persons and over, 1961 and 1966

Unincorporated Places of 50 persons and over

Northwest Territories	1966	1961
Repulse Bay	146	116
Gjoa Haven	162	98
Albert Harbour	64	...
Arctic Bay	123	49
Cape Cunningham	52	...
Clyde	99	40
Foxe Main	...	58
Grise Fiord	98	70
Hall Beach	100	...
Igloojuak	53	15
Igloolik	328	133
Kikitordjuak	60	39
Kingmitokvik	...	65
Kipoyovik	29	66
Nedloa	...	50
Pond Inlet	178	53
Resolute Bay	254	153
Bon Accord	38	66
Broughton Island	201	70
Imigen	53	46
Padloping Island	62	43
Pangnirtung	376	114
Frobisher Bay	1,631	1,426
Lake Harbour	97	90

TABLE 9D-1 continued

Unincorporated Places of 50 persons and over

	1966	1961
Northwest Territories		
Wrigley	136	128
Fort Providence	378	402
Total Unincorporated of 50 persons & over	15,817	11,614
Total Unincorporated of less than 50 persons	1,765	2,839
Unorganized	3,293	2,281
Towns		
Hay River	2,002	1,338 ¹
Yellowknife	3,741	3,245 ¹
Villages		
Fort Smith	2,120	1,681 ²
	28,738	22,998

Notes: ¹Municipal District²Local Improvement District

... Not shown separately

Source: D.B.S., Census of Canada 1961 and 1966



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GEOGRAPHY AND CLIMATE

9E-1.1 – GENERAL

The Yukon and Northwest Territories comprise about one-third of the total area of Canada, covering 207,076 square miles in the Yukon and 1,253,438 square miles in the Northwest Territories. Consequently, there is considerable variation in climate and geography within the two regions.

Climate is a cost factor in any planned activity in the Territories, but in many activities, such as mining, it is not a physical barrier. Mines have been operating successfully on a year-round basis at such points as Yellowknife and Port Radium for many years. Construction is carried on very successfully, by men and machines, during all seasons of the year.

There are four unique characteristics of the climate and geography North of 60 which are not found functioning together in the more southerly regions — extended periods of daylight or darkness, a ground condition known as “permafrost”, extended temperature range and the topographical region of the “barrens” and Arctic Archipelago.

The Arctic Circle marks the southern limit of the area where the sun does not set for one or more days during the summer and does not rise for one or more days during winter. The time of continual daylight north of the Arctic Circle is known as the period of the “midnight sun”.

The word “permafrost” is used to describe that part of the earth’s crust that is less than 32 degrees Fahrenheit (0 degrees Centigrade) in temperature.

The extended temperature range simply means the extremes in temperature that occur in the North as the seasons change. Because of extremes in wind and temperature and the low level of precipitation in the far north, tree life becomes non-existent. The irregular line marking the northern limit of tree growth is known as the “tree line”. It runs roughly on a diagonal from the mouth of the Mackenzie River on the Beaufort Sea, southeast to Hudson Bay, at approximately 60°N. North of this tree line are the “barrens” — low-lying land with innumerable lakes, swamps and muskeg. Beyond the barrens is the Arctic Archipelago a desolate region of mountains, barren islands and glaciers. (See Map 9E-1)

9E-1.1.1 – YUKON TERRITORY

The Yukon is a rugged land of plateaus and mountain ranges, cut off from the Pacific by the Coast and St. Elias Ranges which provide a barrier to the maritime influences from the Pacific. On the east, the Mackenzie Mountains, with ridges of about 8,000 feet, provide a physical barrier separating the Yukon from the Northwest Territories. This barrier also provides a lesser defence from the winter cold waves of the Arctic.

The mountains of the Yukon form the northern part of the Cordilleran Region of North America. Mount Logan in the western Yukon, at 19850 feet, is Canada’s highest mountain and the second highest in North America. East of the Mackenzie Mountains lies the Interior Plain, a rough, irregularly rolling upland, with an average elevation of 4,000 feet. Mountain ranges within the interior plateau rise as high as 7,000 feet.

Cutting through both the mountain systems and the plateau are numerous river valleys, some with flat bottoms and sloping sides, while others have deep, narrow gorges with sides rising sharply. The rivers of the Yukon Territory rise in the northern limits of the

9E-1.1.1

Cordilleran mountain region and flow westward to the Pacific as part of the Pacific Drainage Basin. The Pelly, Stewart and Yukon Rivers are the major elements of this drainage system.

Climate

In climatological terms, the "Arctic" is defined as the area where the mean daily temperature of the warmest month of the year does not exceed 50 degrees F. In general the line marking the southern limit of this area follows the same pattern as the "tree line". The regions of the Yukon and Northwest Territories below this "tree line" are "sub-arctic".

Except for the extreme northern tip, the Yukon Territory is sub-arctic. Wide variations in temperature from month to month and year to year are characteristic of the Territory. The coldest winter months have averaged from -40 to -50 degrees F, while other winter months have an average temperature above 0 degrees F.

The geographic location of the Yukon is mainly responsible for these marked variations in weather. The Territory extends from the relatively warm Pacific to the cold Arctic Ocean. When cold air masses from the Arctic Ocean stagnate over the Yukon, temperatures drop rapidly and remain very low. Fortunately, periods of intense cold are usually of short duration. If the Arctic cold air masses move on eastward, warm air from the north Pacific Ocean fills in behind and winter temperatures may be relatively mild. January mean temperatures:

- + 5°F at Whitehorse
- 2°F at Testlin
- 7°F at Watson Lake
- 16°F at Dawson.

The settlement of Snag holds the record minimum for North America at -81 degrees F. Other minimum temperature records are -62 degrees F. at Whitehorse, -63 degrees F at Teslin and -74 degrees F at Watson Lake. In winter, the days are generally short with no effective sunshine.

Summer temperatures also vary according to the predominant air mass movements. Days can be quite hot when air from the Pacific Ocean or Alaska lies over the Yukon; when the Arctic air invades the Territory cold temperatures prevail. The summers, though short, are pleasantly warm with mean temperatures above 50 degrees F during the months of June, July and August.

The highest temperature on record in the Yukon is 95 degrees F at Dawson and Mayo.

The frost free season is short, ranging from 21 days at Pine Creek to 85 days at Watson Lake. On an average, the last spring frost occurs in mid-June and the first autumn frost in mid-August.

Although the summer season is short the length of days helps to offset such a limited growing period. Dawson City has almost 24 hours of daylight during late June and 20 hours during July. Farther south Whitehorse has about 20 hours of daylight in June and 18 hours in July.

Mean annual precipitation is remarkably uniform over most of the Yukon Territory ranging from 9 to 17 inches at the valley stations. This relatively low amount is due mainly to the high barrier presented by the St. Elias Mountains which cut off moist air from

the Pacific. There is no pronounced wet or dry season although at most weather stations, July and August are the雨iest months and the spring has the least precipitation.

Winter snowfall averages from 40 inches to more than 80 inches with the heaviest falls in the Laird Valley in the St. Elias Mountains and on the westward slopes of the Mackenzie Mountains. Snow usually lies in the valleys from about mid-October to early April. The snow and ice fields of the St. Elias Mountains provide an important source of water for the rivers in the southwestern part of the Territory.

9E-1.1.2 – NORTHWEST TERRITORIES

The Northwest Territories are immense, a land of great contrasts, of mountains and plains, innumerable lakes and semi-deserts, vast expanses of spongy muskeg and stark outcroppings of ancient rock.

The mainland of the Northwest Territories consists of two major geological regions, the Precambrian or Canadian Shield and the Interior Plains. The mountainous Cordilleran region forms the great divide between the Yukon and the Northwest Territories.

The Precambrian Shield, consisting of 700,000 square miles of bedrock, mostly granite, extends from Great Slave Lake in the west to Baffin Island in the east. Except for the rugged mountains of the eastern islands, the Shield rarely rises more than a few hundred feet. Nevertheless, it presents a rugged barren landscape characterized by rolling hills and valleys. In places, the valleys are water-filled which results in striking, finger-like lakes. Then western edge of the Shield is marked by Great Bear and Great Slave Lakes, the largest lakes in Canada.

The Interior Plains lie between the Shield and the Cordilleran region of the western mountains. The plains are a continuation of the Great Plains that stretch from the Gulf of Mexico northward. Within the Territories the plains are dominated by the Mackenzie River.

The variety and contrast of the Arctic Islands is great and often starkly picturesque. In the east, the ancient Precambrian rocks form a spine of mountains from Baffin to Ellesmere Island which rise to heights of 10,000 feet with spectacular vertical cliffs and deep fiords along their eastern coasts. Glaciers are found in the higher altitudes. To the west, are the Arctic lowlands, consisting of recent limestones, sandstones, shale and gravel. North and northwest of these lowlands lies the Sverdrup Basin, an area of higher relief formed by drastic alteration of the sedimentary rocks. At the extreme northwest and fronting the polar basin, is a thin shelf of sedimentary rocks that makes up the Arctic Coastal Plain.

The lands of the Territories, particularly the Arctic, were greatly altered by glaciation. As the glaciers retreated the area was relieved of its tremendous burden of ice and has been rising slowly ever since. The advancing and retreating glaciers sculptured and shaped the face of the area. In regions of the Shield they scraped, smoothed and exposed bare bedrock. In places they formed series of low, elongated parallel hills called moraines. In other areas the granite or sedimentary bedrock was covered with boulders, sand and silt. The streams of water produced from the melting glaciers washed out and deposited sand in the form of long, low hills or eskers that resemble serpentine railway embankments running for miles across the country.

Geologically the arctic regions have just emerged from the last glacial period and in a sense are still in the grip of a "little ice age". The ice fields and glaciers of the eastern Arctic cover 60,000 square miles. In addition the arctic seas and straits are ice filled for a large part of the year.

The major river systems of the Territories are closely related to the physical regions. In the Precambrian Shield area the main rivers are the Thelon, Kazan, Dubawnt and Back. With the exception of the Thelon, these rivers have falls, cataracts and innumerable shallow rapids which impede navigation. In the Interior Plains, the great, central river is the Mackenzie. In contrast to the rivers of the Shield this river is navigable for the whole of its 1400 mile length. It reaches the sea through an extensive maze of channels which wind through a delta spreading over several hundred square miles.

Climate

Approximately half the mainland area of the Northwest Territories and all of the Arctic Islands lie in the Arctic.

For more than half of the year these regions experience severe and persistent cold. The freezing season starts in September over the high Arctic, advances southward, following progressively colder air outbreaks and reaches the southern limits of the sub-Arctic in late October. The turbulent flow of cold air, as it spreads across the relatively warmer open seas and channels, produces the stormiest period of the year and accounts for most of the winter's snowfall. By December, with most of the moisture sources sealed off by ice, the cold atmosphere contains so little moisture that the few disturbances produce only thin cloud layers, and consequently, snowfall is very light. Average annual snowfall in the Arctic region is less than 30 inches.

Temperatures seldom rise above the freezing point from December to February in the sub-Arctic, and from November to April in the Arctic. Blowing snow and the chilling effect of strong winds present major hazards to winter travel throughout the treeless Arctic, although the frequency and severity of blizzard conditions vary widely over the region. The region most frequented by blizzards is the barren lands west of Hudson Bay, where strong winds are common. January is normally the coldest month.

In the Mackenzie Basin mean monthly temperatures are below 30 degrees fahrenheit for seven months, April to October, although winter minimum temperatures may fall below -70 degrees F and summer maximum rise above 95 degrees F.

On the barrens mean temperatures are below freezing for eight or nine months of the year.

In the Arctic Islands the mean annual temperatures are lower than in any other part of Canada, -15 degrees F and 0 degrees F in the very far north on Melville and Ellesmere Islands.

In the winter most water surfaces are frozen but the new ice is usually less than six feet thick. The highest mean January temperatures occur in the Hudson Strait area with values ranging from 0 degrees F to -5 degrees F at the eastern entrance and -10 degrees F to -15 degrees F at the western end. The lowest January mean of -30 degrees F to -35 degrees F occurs north of 75° latitude which cuts through the lower part of Melville Island.

February marks the start of a return to warmer weather in the Northwest Territories. However, temperatures above freezing are not reached until May in the sub-Arctic, and June in the Arctic. In the Mackenzie Valley the snows disappear in May, but not until June in the Arctic. Summer is short but pleasantly sunny and warm in the sub-Arctic. In the Mackenzie Valley there are three summer months with temperatures over 50 degrees F. The warmest month in the valley is July with a mean of about 60 degrees F in the upper portion of the region. The frost-free period in the Mackenzie Basin varies from 50 to 100 days.

On the barrens the mean daily maximum temperature during the summer months rises to 55 degrees F or 60 degrees F. Extreme summer temperatures have exceeded 85 degrees F occasionally. Spring comes very late, delayed by the slow melting of the ice and subsequently, by the cold water of the sea, lakes and muskeg. Freezing temperatures may occur during any month of the year, but on the average there is a frost-free period of 40 to more than 60 days throughout the region.

In the Arctic Archipelago temperature extremes are not as severe as in a continental area at the same latitude. During the cool, brief summer the ice-filled polar waters, with a surface temperature near 30 degrees F, prevent the air from warming to any extent. Consequently, summer temperatures are uniformly cool throughout the entire region, averaging 40 degrees F to 45 degrees F during July, the warmest month.

Precipitation in the Territories is light. In the Mackenzie Basin the annual total range is from 9 to 15 inches. Annual snowfall in the sub-Arctic area is about 50 inches. On the barrens precipitation decreases from 12 inches in the south to seven or eight inches in the north, with snowfall contributing about 40 to 50% of the total moisture. Snowfall in the Arctic region is less than 30 inches annually. The greatest amount of precipitation in the barrens falls in the summer and early autumn. Snow covers the ground for almost eight months of the year, with the greatest monthly snowfall in October and November. Strong winds are frequent in this area in winter, especially the District of Keewatin.

The Arctic Archipelago is one of the driest regions in the world. The annual total precipitation over the islands north of the Parry group averages less than 5 inches, with Eureka having an average of only 2.5 inches and Mould Bay only 3 inches a year.

Southward from the Parry Islands there is an increase of annual precipitation. In southern Baffin Island the mean annual totals range from 10 to 15 inches. Snow may fall during any month of the year but rain is limited to the relatively short, summer warm period. In the south 40 to 50% of the annual total precipitation occurs as rain and in the very far north this is decreased to about 30%. Although showers and even a rare thunderstorm may occur occasionally in the southern part of the Archipelago, most annual rainfall is in the form of a light drizzle. Although snowfall is light in the Arctic, a distinct monthly maximum is observed in the autumn and also a spring maximum which is not as marked in the southern half of the Archipelago as in the north. The tiny snow crystals are readily blown about by the wind, and as a result most of the ground is bare all winter, while deep drifts are formed in ravines, hollows and in the lee of obstacles.

9E-2.1 – PERMAFROST

Perennially frozen ground or permafrost, is probably the best known and yet least understood feature of the North. Although not a new phenomenon, it is only the relatively recent building of resource development projects that has made the special problems of construction in permafrost so evident to engineers.

“Permafrost” is that part of the earth’s crust where the temperature is below 32 degrees F. The term describes only the thermal condition of the ground and not its composition which may be bedrock, gravel, sand, silt, clay or muskeg, singly or in combination.

In the case of solid rock, gravel and sand, the frozen condition does not seriously affect the engineering properties of material. If, however, the ground consists of water-bearing silt or clay, freezing transforms the material to a hard and solid mass. It is to such perennially frozen silt and clay that the name permafrost is popularly applied.

The ground in permafrost areas is normally thought of as two distinct layers: the upper, or active layer, which alternately freezes and thaws with the seasons; and the lower, or permafrost layer, which remains frozen continuously. The depth of the active layer varies with many local factors including soil type, moisture content and vegetative cover in much the same way as depth of frost penetration varies with local conditions in the more southerly areas of Canada. Similarly, foundations located in the active zone are exposed to frost action problems analogous to those encountered in the freezing zone of the soil in more temperate regions. Almost one-half of the land area of Canada is underlain by permafrost. Although chiefly confined to the Northwest Territories and Yukon Territory, it does extend into the upper portions of the provinces, particularly into the northern parts of Manitoba and Quebec. As would be expected, the thickness of permafrost increases toward the north, ranging from a few feet in areas such as Hay River to approximately 1300 feet at Resolute Bay in the Arctic Islands.

The southern limit of permafrost is not a well-defined line, it consists of a belt of land several hundred miles wide in which areas of continuous permafrost give way to areas of sporadic permafrost, where the frozen ground tends to exist only as scattered patches or islands within the unfrozen material.

It is these latter areas that often pose the most difficult construction problems for the engineer, due mainly to the limited extent of permafrost and consequent difficulty of predicting its occurrence at a specific location, and to its temperature which is generally near 32 degrees F and thus close to melting.

It is the melting of permafrost containing large quantities of ice that gives rise to the major construction problems in permafrost areas. The ice in frozen soil can take the form of layers or lenses ranging from hairline size to 3 or 4 feet in thickness, or can occur as coatings over small soil particles, stones and boulders. Some of the most spectacular ice deposits are found as chunks or wedges buried in the frozen ground.

For soils in a frozen condition, the ice acts like a cement, bonding the individual particles together and producing a soil with considerable strength. When thawed, however, the hard-frozen soil can change to a soft slurry with little or no supporting power.

Knowledge of the ice content of frozen soil is of major importance to the engineer since it provides a measure of the extent to which settlements will occur or trafficability will be affected by thawing. Materials such as frozen rock, gravel, or coarse sand frequently contain little ice and thus impose few problems. Much of the Territories, however, is

underlain by fine-grained soils resulting from glacial action. Such soils generally have high ice contents up to six times that of the soil by volume and if these are to provide suitable support for engineering structures, they must not be allowed to thaw. This is difficult to achieve in view of the extreme sensitivity of permafrost to temperature differences.

In undisturbed areas of permafrost, a delicate condition of temperature equilibrium exists between the top of the permafrost and the ground surface. Any changes in the natural insulating cover such as the stripping of moss can upset this thermal balance of nature and start the permafrost thawing. Even one passage of a tracked vehicle over the natural ground surface will reduce the insulating value of the moss cover sufficiently to cause thawing.

Preservation of the frozen condition during construction and operation of a building or other engineering facility requires not only specific design and construction techniques but also strict discipline and control of all construction operations. In many cases, it is necessary to protect the organic cover prior to beginning work in an area by placing a one-to-two foot gravel layer over all areas that might be disturbed.

Another property of permafrost is its imperviousness to the flow of water. Water cannot percolate through the perennially frozen ground, so all water movement tends to occur over or just below the ground surface. This lack of sub-surface drainage often results in an excess of surface water even though much of the Territories is characterized by very low precipitation. If natural drainage is impeded by construction, the accumulated water will accelerate the thawing of the permafrost, with possible serious results.

Since the problems of construction are greatly lessened in rock or granular soils with little ice content, location of such areas is a most important element in northern construction.

Although the siting of engineering facilities on granular materials containing little or no ice permits the use of conventional design and construction techniques, this is not always possible. Where fine-grained materials with high ice contents must be utilized, every effort should be made to preserve the frozen condition of the ground.

The way in which this is achieved in practice will depend on the type of engineering structure. For heated buildings and most enclosures, the ventilation method is commonly used. With this method, the structure is raised above the ground to permit circulation of air beneath, thus minimizing heat flow to the permafrost. The foundations are usually embedded in the perennially frozen ground so that some lowering of the permafrost table can be tolerated without loss of support. Steamed-in piles have proved particularly well suited to this method in fine-grained soils. Where stones and boulders in the soil make pile placing difficult, however, alternative foundation designs may prove more economical.

Occasionally, surface foundations are used. In such cases, an insulating blanket of gravel is first placed on the undisturbed ground to retard downward heat flow from the building constructed over it. This method must be used with caution since the thickness of gravel required to preserve the permafrost will vary with many local factors and is difficult to predict. Within this type of construction, even slight lowering of the permafrost table may cause settlement depending on the soil properties, and in addition, the problem of frost action in the active layer of soil beneath building may prove serious.

These considerations become particularly critical in road and airstrip construction where the ventilation method, as used with buildings, cannot be applied and an

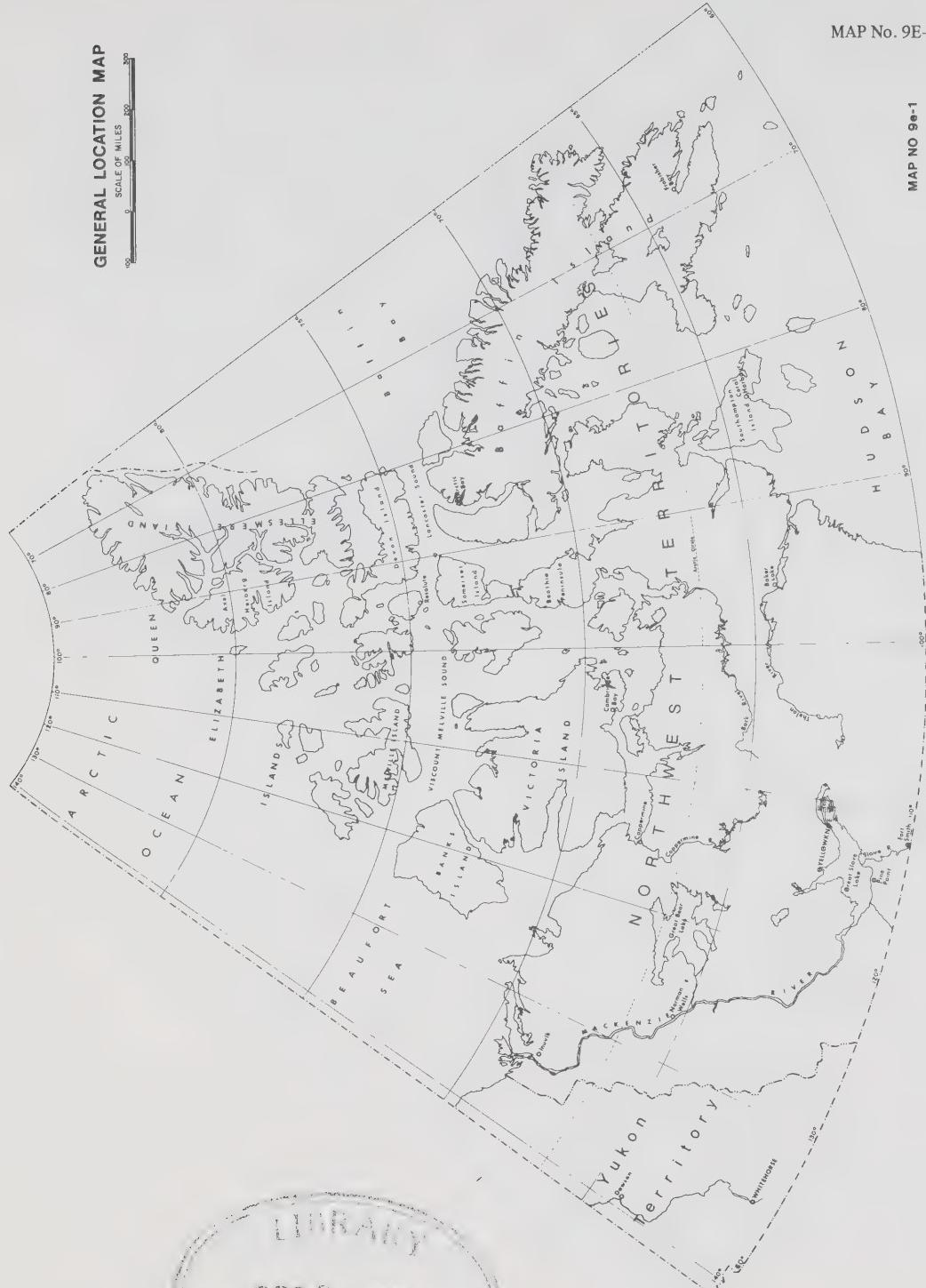
insulating gravel blanket must be relied on to retain the thermal regime. In such cases, the importance of selecting the most favorable site and of keeping disturbance of the surface cover to an absolute minimum in poor soil conditions takes on even greater significance. The only exception to this principle of preserving the frozen ground exists in patches and is close to melting. In these areas it may be economical to remove the permafrost by thawing prior to construction and then to build in the normal way.

Normal excavation techniques are much less effective in permafrost. Where gravel fill is required, particularly the large amounts needed for roads and airstrips, borrow pits should be located, stripped of vegetation, and allowed to thaw by natural means, well in advance of construction.

Permafrost imposes difficulties with water and sewage facilities by complicating the location of sub-surface water supplies and seriously limiting the use of the usual methods of sewage disposal into the soil. In addition to the foundation stability problem resulting from thawing of permafrost, water and sewer lines cannot be placed below frost level and are therefore subject to freezing hazards. To overcome such difficulties, the utility lines are often placed in heated and insulated boxes, called utilidors, located above grade and supported in a manner similar to buildings. (See Maps 9E 2 to 9E 4)

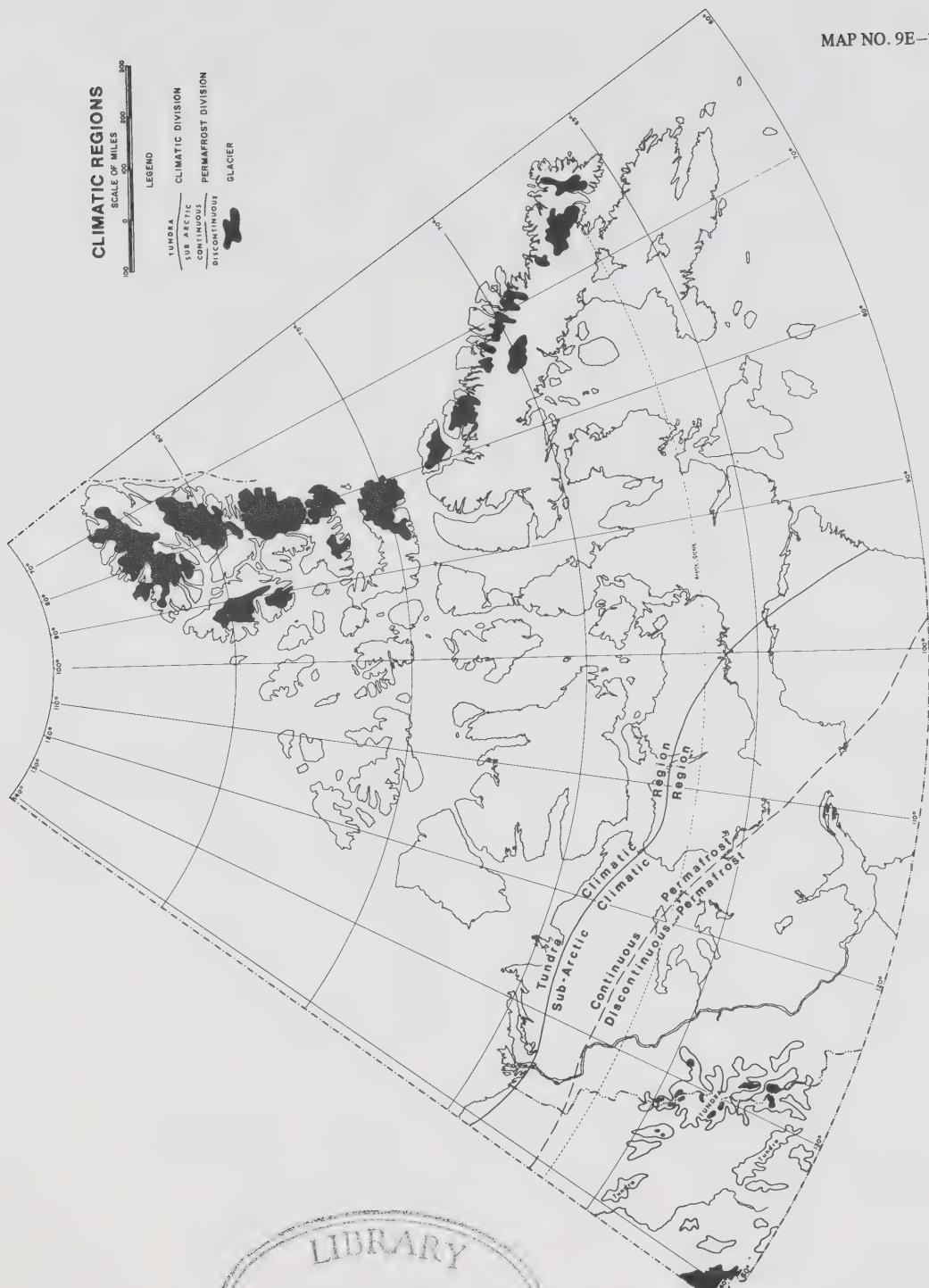
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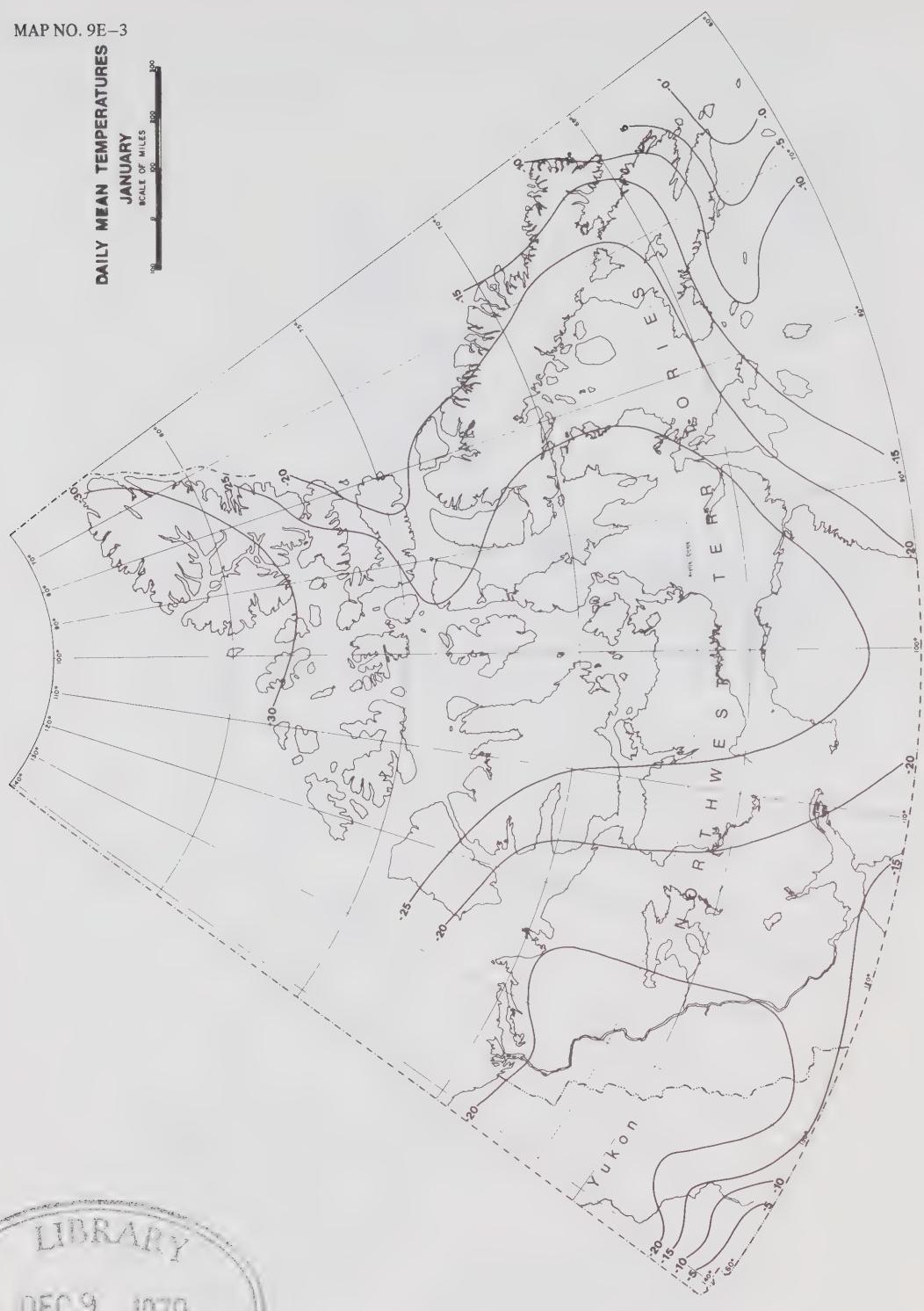




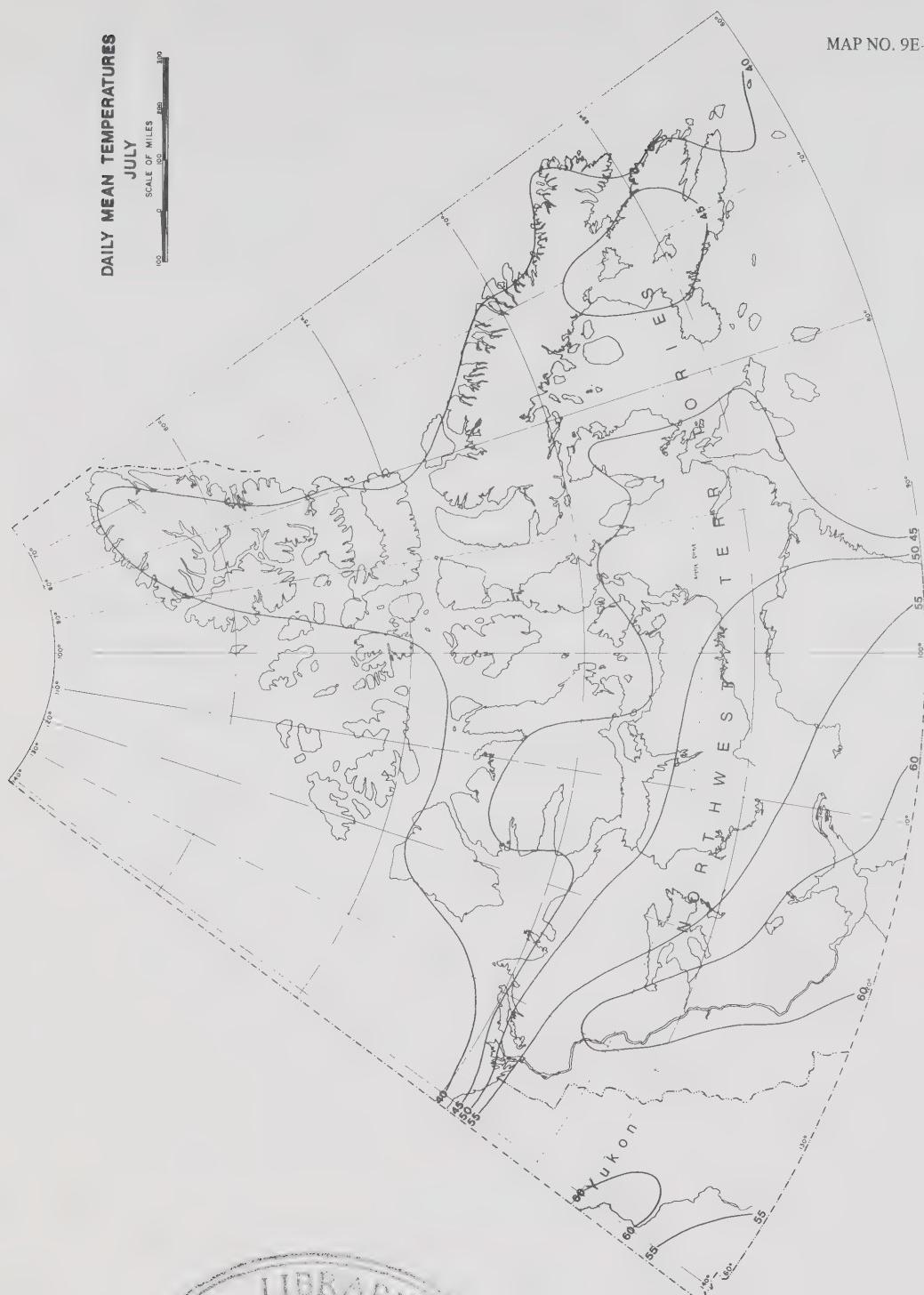
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MAP NO. 9E-4





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Revised April, 1971.

COMMUNICATION SYSTEMS

NORTHERN CANADA

SCALE OF MILES
100 0 100 200 300

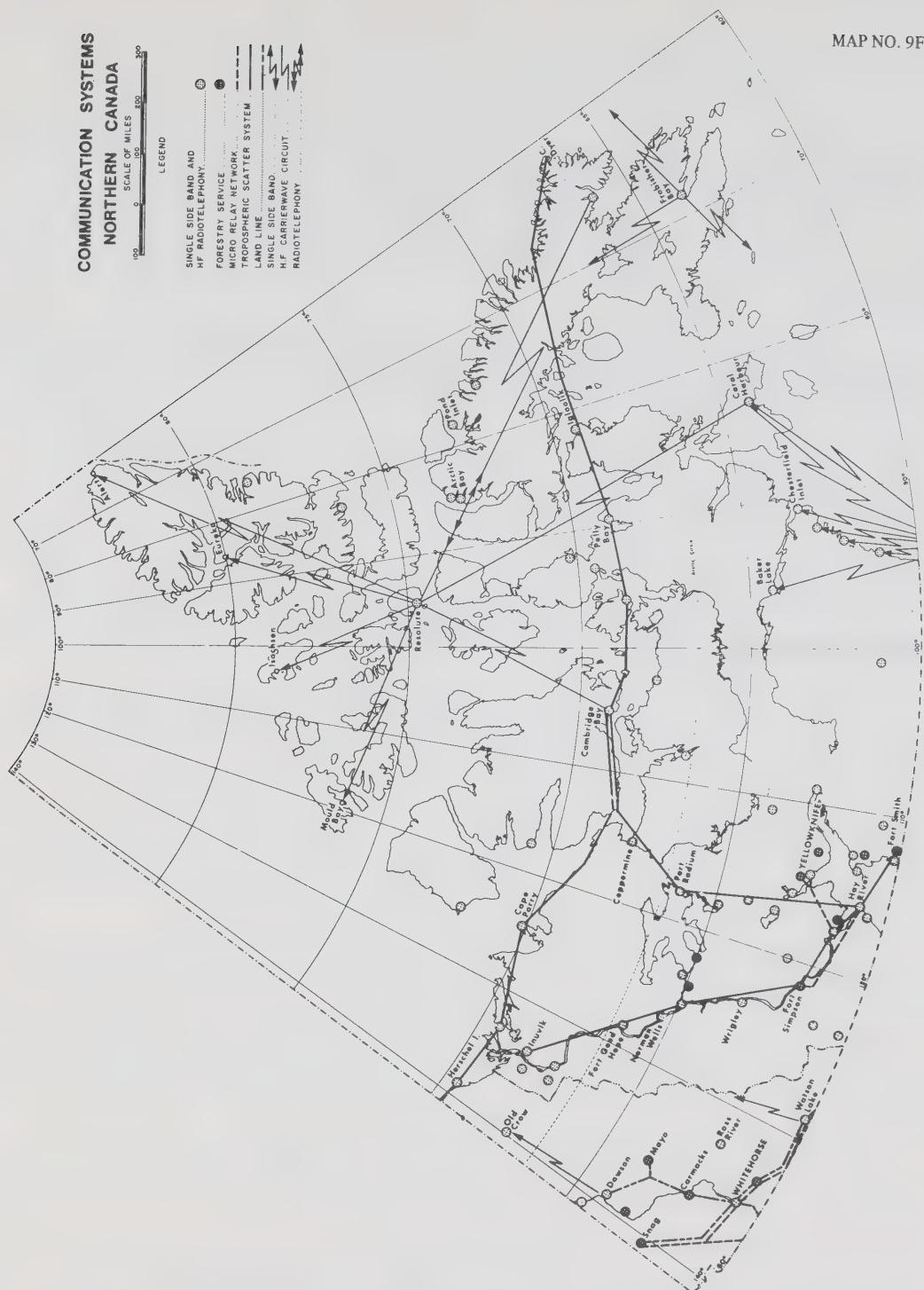
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graph TD
 HF[HF RADIOTELEPHONY] --- SSB[SINGLE SIDE BAND AND
FORESTRY SERVICE]
 SSB --- MRN[MICRO RELAY NETWORK]
 SSB --- TSS[TROPOSPHERIC SCATTER SYSTEM]
 TSS --- LAND[LAND LINE]
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 TSS --- RTT[RADIOTELLEPHONY]

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MAP NO. 9F-1



9F-3.1

## **9F-3.1 – NORTHWEST TERRITORIES**

### **9F-3.1.1 – Micro-Relay/Troposphere – Scatter Systems**

Canadian National Telecommunications/Canadian Pacific Telecommunications network serves the Northwest Territories, via Edmonton, Alta.

CNT/Alberta Government Telephones operate a high-quality micro-relay between Edmonton, Alta. and Hay River, N.W.T., to provide a direct link between the Territories and southern Canada.

A combination micro-relay and troposphere-scatter system between Sept Isles, Que. Goose Bay, Labrador and Frobisher Bay handles all traffic to and from Baffin Island and the eastern regions of the Northwest Territories.

CNT/Saskatchewan Government Telephones operate a tropospheric-scatter system between Uranium City, Sask., and Fort Smith, N.W.T. Messages are routed via Hay River, N.W.T.

CNT operates a troposphere-scatter system between Hay River, N.W.T., and Lady Franklin Point, N.W.T. This system was originally built by the USAF for communication with distant early warning stations in the Far North. Telephone and telegraph messages originating in southern Canada are carried on a commercial basis to Lady Franklin Point, and then on leased DEWline facilities to Cambridge Bay, N.W.T.

CNT operates a troposphere-scatter system between Goose Bay, Labrador and Frobisher Bay, NWT, providing services required by Frobisher Bay residents. This is the only direct link between Baffin Island and southern Canada.

### **9F-3.1.2 – Land Lines**

A CNT line provides voice and radio transmissions between Hay River, N.W.T. and Inuvik, N.W.T., with connections to intermediate points along the Mackenzie River.

Connected to this system are service extensions to settlements along the Peel River, Tuk, Aklavik and to Reindeer Depot.

A high-quality land line, built and operated by CNT, runs between Fort Smith, N.W.T. and Yellowknife, N.W.T. Settlements along the north and south shores of Great Slave Lake, and Uranium City Sask., are connected to the system.

All communications to the Keewatin district are channelled along the CNT line from The Pas, Man., to Churchill, Man.

### **9F-3.1.3 – Telephone**

Bell Canada operates a radio-telephone system between Moosonee, Ont.; Alma, Que.; Goose Bay; Labrador; and Frobisher Bay, N.W.T.; and the smaller communities in the area. Communications from Resolute Bay on Cornwallis Island are transmitted to Frobisher Bay, and then to southern Canada via Goose Bay, Labrador.

### **9F-3.1.4 – Television**

The Canadian Broadcasting Corporation provides a frontier package service at Yellowknife, Pine Point and Inuvik.

## COMMUNICATIONS

### **9F-1.1 — General**

As the Yukon and the Northwest Territories open their resources for development, government and industry are combining to establish a modern, efficient communications network throughout the vast regions. Today, most of the area North of 60 is linked with southern Canada by the network, which combines a number of communications systems.

In the Yukon Territory most communication facilities are operated by Canadian National Telecommunications. Telecommunications are by land line from Whitehorse to the principal communities of the Yukon. In addition there are land links to the Alaskan Panhandle communities of Skagway and Haines where connections tie-in to the troposphere-scatter system operated along the Alaskan coast.

In the Northwest Territories, commercial telecommunications are provided by Canadian National Telecommunications in the western regions, and by Bell Canada in the eastern regions.

In addition to commercial facilities, several government and private radio networks are in operation North of 60, which provide message services for local residents.

The Federal Department of Transport operates a radio and telegraph network for its aeronautical and meteorological services, for air and marine traffic, and for the transmission of meteorological data.

The Department of Indian Affairs and Northern Development operates a radio network in the Mackenzie District for administration purposes and for forest and game protection. Other networks are operated by the Royal Canadian Mounted Police, the Hudson's Bay Company and various religious missions throughout the Territories.

Radio and television broadcasting is developing rapidly in the Territories. The Northern Service of the Canadian Broadcasting Corporation provides a radio service for most areas through medium and short-wave broadcasts. This Northern Service serves 35 communities on medium wave in the Yukon, the Northwest Territories and the northern areas of the provinces. Program material for the short-wave High Arctic service originates at Montreal and is sent by landline to Sackville, N.B. for transmission.

The Northern Service has five program centres in the Territories: Yellowknife, Inuvik, Frobisher Bay, N.W.T.; Whitehorse, Y.T.; and Churchill, Man. With the exception of Frobisher Bay, all are connected to the national network of the CBC.

The remaining stations in the Territories, designated as Low Power Relay Transmitters (LPRT), are normally unattended. These are grouped into two regional networks having program centres at Whitehorse for the Yukon and Yellowknife for the Mackenzie Valley-Great Slave area. These regional networks are in turn connected to the national English radio network. At each LPRT point a community newscaster reports on local news to the regional network centre for broadcast over the regional network. In addition, most LPRT communities also have a sports correspondent who reports to the regional centre.

The community station at Frobisher Bay is served by tape recordings and short-wave transmission pickups from the southern stations.

Short-wave radio transmission to northern Canada is erratic due to problems of transmission across the auroral zone and interference from foreign broadcasting stations.

The Northern Service of the CBC proposes to install new equipment to improve performance and coverage. The total hours of daily transmission will be extended from the present 8 1/2 to 18 hours.

Television is still a relatively new and costly undertaking North of 60. To provide a television service to residents of remote and isolated areas the CBC has developed a frontier package service. This package consists of a helical-track master video tape recording installation, which is installed in a television network connected or originating studio building. The recorded video tapes are regularly flown to the frontier transmitter stations where video playback units provide the audio and video inputs to the television transmitter. Taped programs run for about four hours.

The CBC frontier package stations are in daily operation in Clinton Creek, Dawson, Elsa, Watson Lake and Whitehorse, Y.T.; and Inuvik, Pine Point and Yellowknife, N.W.T.

A privately owned closed circuit television system operates at Whitehorse.

Creation of a domestic satellite communications system for Canada will have a profound effect on northern Canada. The satellite to be launched in 1972 will enable television and high quality communications to be extended throughout the North. The rate of growth of television service will be dependent on the availability of funds to establish additional earth stations. There is no technical limitation in extending TV coverage to any northern location provided the satellite is visible from the earth station site.

The provision of adequate telephone communication services employing the satellite will evolve over a longer period while technical problems are overcome.

## **9F-2.1 – YUKON TERRITORY**

### **9F-2.1.1 – Micro-Relay/Troposphere-Scatter System**

The Canadian National Telecommunications/Canadian Pacific Telecommunications network connects the Yukon Territory with southern Canada via Edmonton, Alberta.

A micro-relay system operated by CNT between Grande Prairie, Alberta and Fairbanks, Alaska via Mount Davie in the Yukon, originally built for military purposes, is also used for all non-military traffic to the Yukon and Alaska. The system is designed to provide television transmission facilities with the installation of a TV channel.

A high-quality micro-relay and troposphere-scatter system from Victoria, B.C. to Haines, Alaska, provides an alternate route to the Grande Prairie-Fairbanks system.

### **9F-2.1.2 – Land Lines**

Canadian National Telecommunications offers telephone and telegraph land line service to Whitehorse, Mayo, Dawson, Elsa and Keno, and other smaller communities.

### **9F-2.1.3 – Television**

The Canadian Broadcasting Corporation provides a four-hour-a-day frontier package service at Clinton Creek, Dawson, Elsa, Watson Lake and Whitehorse. A privately owned, closed circuit television station operates in Whitehorse.

### **9F-2.1.4 – Radio**

Short-wave programs are broadcast to the Territories daily from the Canadian Broadcasting Corporation's station at Sackville, N.B. Broadcasts are conducted in English, French and Eskimo.

There are 28 standard wave broadcast stations serving the Yukon and the Northwest Territories. The majority are low-power, unattended, relay transmitters which broadcast the CBC network programs. All are owned and operated by the CBC.

### **9F-2.1.5 – Mail**

Regular mail services are available in the Yukon. The frequency of service depends on the size, importance and location of the settlement. Most mail is delivered by air, although in southern areas, both air and truck services are used.



## **9F-3.1 – NORTHWEST TERRITORIES**

### **9F-3.1.1 – Micro-Relay/Troposphere – Scatter Systems**

Canadian National Telecommunications/Canadian Pacific Telecommunications network serves the Northwest Territories, via Edmonton, Alta.

CNT/Alberta Government Telephones operate a high-quality micro-relay between Edmonton, Alta, and Hay River, NWT, to provide a direct link between the Territories and southern Canada.

A combination micro-relay and troposphere – scatter system between Sept Isles, Que., Goose Bay, Labrador and Frobisher Bay handles all traffic to and from Baffin Island and the eastern regions of the Northwest Territories.

CNT/Saskatchewan Government Telephones operate a tropospheric scatter system between Uranium City, Sask., and Fort Smith, NWT. Messages are routed via Hay River, NWT.

CNT operates a troposphere – scatter system between Hay River, NWT, and Lady Franklin Point, NWT. This system was originally built by the USAF for communication with distant early warning stations in the Far North. Telephone and telegraph messages originating in southern Canada are carried on a commercial basis to Lady Franklin Point, and then on leased DEW line facilities to Cambridge Bay, NWT.

CNT operates at troposphere – scatter system between Goose Bay, Labrador and Frobisher Bay, NWT, providing services required by Frobisher Bay residents. This is the only direct link between Baffin Island and southern Canada.

### **9F-3.1.2 – Land Lines**

A CNT line provides voice and radio transmissions between Hay River, NWT and Inuvik, NWT, with connections to intermediate points along the Mackenzie River.

Connected to this system are service extensions to settlements along the Peel River, Tuk, Aklavik and to Reindeer Depot.

A high-quality land line, built and operated by CNT, runs between Fort Smith, NWT and Yellowknife, NWT. Settlements along the north and south shores of Great Slave Lake, and Uranium City Sask., connected to the system.

All communication to the Keewatin district are channelled along the CNT line from The Pas, Man., to Churchill, Man.

### **9F-3.1.3 – Telephone**

Bell Canada operates a radio-telephone system between Moosonee, Ont., Alma, Que., Goose Bay, Labrador and Frobisher Bay, NWT, and the smaller communities in the area. Communications from Resolute Bay on Cornwallis Island are transmitted to Frobisher Bay, and then to southern Canada via Goose Bay, Labrador.

### **9F-3.1.4 – Television**

The Canadian Broadcasting Corporation operates a television station at Yellowknife. Programs are supplied by the CBC on film and videotape.

#### **9F-3.1.5**

##### **9F-3.1.5 – Radio**

Short-wave programs are broadcast by the CBC from its station at Sackville, N.B. in English, French and Eskimo. The service is the only source of Canadian Radio programs for residents of the eastern Arctic.

Twenty-eight standard wave broadcast stations serve both Territories, the majority being low-power, unattended relay transmitters owned and operated by the CBC.

##### **9F-3.1.6 – Mail**

Regular mail services are available at most settlements in the Northwest Territories. The frequency of service depends on the size, importance and location of the settlement. Most mail is delivered by air.

**9F-3.1.5 – Radio**

Short-wave programs are broadcast by the CBC from its station at Sackville, N.B. in English, French and Eskimo. The service is the only source of Canadian radio programs for residents of the eastern Arctic.

Twenty-eight standard-wave broadcast stations serve both Territories, the majority being low-power, unattended relay transmitters owned and operated by the CBC.

**9F-3.1.6 – Mail**

Regular mail services are available at most settlements in the Northwest Territories. The frequency of service depends on the size, importance and location of the settlement. Most mail is delivered by air.

#### **9F-4.1 ADDITIONAL INFORMATION SOURCES**

More detailed information on communications services North of 60 may be obtained by writing:

Northern Economic Development Branch,  
Department of Indian Affairs and Northern Development,  
400 Laurier Avenue,  
Ottawa, Ontario.

Canadian National Telecommunications,  
600 Peel Street,  
Montreal, P.Q.

Canadian National Telecommunications,  
CN Tower,  
104th Ave. and 100th St.,  
Edmonton, Alberta.

Hudson's Bay Company,  
Winnipeg,  
Manitoba.

Anglican Church of Canada,  
600 Jarvis Street,  
Toronto, Ontario.

Bell Canada  
1050 Beaver Hall Hill,  
Montreal, P.Q.

Bell Canada,  
1150 Chemin St. Louis,  
Sillery, P.Q.

Northern Service,  
Canadian Broadcasting Corporation,  
Montreal, P.Q.

#### 9F-4.1 – ADDITIONAL INFORMATION SOURCES

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Montreal, P.Q.

Bell Canada,  
1150 Chemin St. Louis,  
Sillery, P.Q.

Northern Service,  
Canadian Broadcasting Corporation,  
Montreal, P.Q.



**TABLE 9F-1**  
**TYPICAL TELEPHONE RATES**  
**NORTH OF 60 (IN DOLLARS)**

| Route                  | Day                |                                 | Night              |                                 |
|------------------------|--------------------|---------------------------------|--------------------|---------------------------------|
|                        | First<br>3 minutes | Each<br>additional<br>3 minutes | First<br>3 minutes | Each<br>additional<br>3 minutes |
| Edmonton-Yellowknife   | 3.75 p-p*          | 0.80                            | 2.80               | 0.60                            |
|                        | 2.50 s-s**         | 0.80                            | 1.85               | 0.60                            |
| Edmonton-Inuvik        | 4.65               | 1.00                            | 3.50               | 0.75                            |
|                        | 3.10               | 1.00                            | 2.30               | 0.75                            |
| Edmonton-Whitehorse    | 6.05               | 1.50                            | 4.60               | 1.00                            |
|                        | 4.05               | 1.00                            | 2.95               | 0.90                            |
| Edmonton-Dawson        | 6.40               | 1.65                            | 4.85               | 1.00                            |
|                        | 4.25               | 1.00                            | 3.15               | 0.90                            |
| Yellowknife-Whitehorse | 6.20               | 1.35                            | 4.65               | 1.00                            |
|                        | 4.15               | 1.35                            | 3.10               | 1.00                            |

\*p-p Person to Person

\*\*s-s Station to Station

**TABLE 9F-2**  
**TYPICAL TELEGRAPH RATES**  
**NORTH OF 60 (IN DOLLARS)**

| Route                  | Day Rate          |                                |                          | Night Rate        |                                               |
|------------------------|-------------------|--------------------------------|--------------------------|-------------------|-----------------------------------------------|
|                        | First 15<br>words | Next 10<br>words<br>(per word) | Each<br>word<br>above 25 | First<br>50 words | Each<br>group<br>of 10<br>words<br>over<br>50 |
| Edmonton-Yellowknife   | 1.55              | 0.07                           | 0.04                     | 1.25              | 0.25                                          |
| "-Inuvik               | 2.15              | 0.09                           | 0.06                     | 1.75              | 0.35                                          |
| "-Whitehorse           | 1.85              | 0.08                           | 0.05                     | 1.50              | 0.30                                          |
| "-Dawson               | 2.15              | 0.09                           | 0.06                     | 1.75              | 0.35                                          |
| Yellowknife-Whitehorse | 1.55              | 0.07                           | 0.04                     | 1.25              | 0.25                                          |

**TABLE 9F-3**  
**NAME OF TELECOMMUNICATION AGENCIES**

|                                    | <b>DOT</b> | <b>CNT</b> | <b>BELL</b> | <b>RCMP</b> | <b>HBCO</b>                                                                    | <b>DIA</b> | <b>DNH</b>                                        | <b>DNR</b> |
|------------------------------------|------------|------------|-------------|-------------|--------------------------------------------------------------------------------|------------|---------------------------------------------------|------------|
| Aishihik                           | —          | X          |             |             |                                                                                |            |                                                   |            |
| Aklavik                            | —          | X          |             |             | E                                                                              |            |                                                   |            |
| Alert                              |            | X          |             |             |                                                                                |            |                                                   |            |
| Alexandria<br>Fiord                |            | —          |             |             |                                                                                |            | (B)<br>Opr. Dept.<br>Energy, Mines<br>& Resources |            |
| Arctic Bay                         | —          |            | X           |             |                                                                                | B          |                                                   |            |
| Arctic<br>Red River                |            |            | X           |             | E                                                                              |            | B                                                 |            |
| Baker Lake                         |            |            |             |             |                                                                                |            | (X)<br>DIA will<br>operate<br>for Bell            |            |
| Bathurst Inlet                     | —          | X          |             |             |                                                                                | B          |                                                   | B          |
| Baychimo                           | —          |            |             |             |                                                                                | B          |                                                   |            |
| Belcher<br>Island                  | —          |            |             |             |                                                                                | B          |                                                   |            |
| Broughton<br>Islands               |            |            | P           |             |                                                                                | B          |                                                   |            |
| Buffalo River                      |            | X          |             |             |                                                                                |            |                                                   |            |
| Brie du Poste                      |            |            | X           |             |                                                                                |            |                                                   |            |
| Batteau                            |            |            | X           |             |                                                                                |            |                                                   |            |
| Battle Harbour                     |            |            | X           |             |                                                                                |            |                                                   |            |
| Black Tickle                       |            |            | X           |             |                                                                                |            |                                                   |            |
| Cape Christan<br>(See Clyde River) |            |            |             |             |                                                                                |            |                                                   |            |
| Cape Dorset                        | —          |            | X           |             |                                                                                |            |                                                   |            |
| Cape Dyer (DYE)                    | —          |            | DL          | X           |                                                                                |            |                                                   |            |
|                                    |            |            |             |             | Private Toll Stn. operated by USAF<br>through their base station at Goose Bay. |            |                                                   |            |
| Cape Hopes<br>Advance              |            | X          |             |             |                                                                                |            |                                                   |            |
| Cape Parry<br>(PIN)                |            |            | DL          |             |                                                                                | B          |                                                   |            |
| Cambridge Bay<br>(CAM)             | X          | X          |             |             |                                                                                |            |                                                   |            |
| Carmacks                           | —          | X          |             | E           |                                                                                |            |                                                   |            |

TABLE 9F-3 continued

|                                                              | DOT | CNT | BELL | RCMP | HBCO | DIA                                    | DNH | DNR |
|--------------------------------------------------------------|-----|-----|------|------|------|----------------------------------------|-----|-----|
| Chesterfield Inlet                                           |     |     |      |      |      | (X)<br>DIA will<br>operate<br>for Bell |     |     |
| Clyde River                                                  | X   |     | P    |      |      |                                        |     |     |
| Contwoyto Lake<br>(Pellett Lake)                             | —   | X   |      |      |      | (b)<br>Opr. Pacific<br>West Airways    |     |     |
| Coppermine                                                   | X   | X   |      | E    |      |                                        |     |     |
| Coral Harbour<br>(airport)<br>(See also<br>Southampton Isl.) | X   |     | P    |      |      |                                        |     |     |
| Cape St.<br>Charles                                          |     |     | X    |      |      |                                        |     |     |
| Charlottetown                                                |     |     | X    |      |      |                                        |     |     |
| Canatiche                                                    |     |     | X    |      |      |                                        |     |     |
| Cartwright,<br>Labrador                                      |     |     | X    |      |      |                                        |     |     |
| Dawson, Y.T.                                                 | —   | X   |      | E    |      |                                        |     |     |
| Discovery                                                    | —   | X   |      |      |      |                                        |     |     |
| Elsa                                                         | —   | X   |      | E    |      |                                        |     |     |
| Emeril                                                       | —   |     | X    |      |      |                                        |     |     |
| Ennadai Lake                                                 | X   |     |      |      | B    |                                        |     |     |
| Enterprise                                                   | —   | X   |      |      |      |                                        |     |     |
| Eskimo Point                                                 |     |     |      |      |      | (X)<br>DIA will<br>operate<br>for Bell |     |     |
| Eureka                                                       | X   |     |      |      |      |                                        |     |     |
| Ferguson Lake                                                | —   |     |      |      | B    |                                        |     |     |
| Fifth Meridian                                               |     |     |      |      | B    |                                        |     |     |
| Fort Franklin                                                | —   | P   |      |      | B    |                                        |     |     |
| Fort Good Hope                                               | —   | X   |      | E    |      |                                        |     |     |
| Fort Liard                                                   | —   | X   |      |      | B    |                                        |     |     |
| Fort McPherson                                               | —   | X   |      | E    |      |                                        |     |     |
| Fort Norman                                                  | —   | X   |      | E    |      |                                        |     |     |
| Fort Providence                                              | —   | X   |      |      |      |                                        |     |     |

TABLE 9F-3 continued

|                              | DOT | CNT | BELL | RCMP | HBCO | DIA | DNH | DNR |
|------------------------------|-----|-----|------|------|------|-----|-----|-----|
| Fort Rae (See Rae)           |     |     |      |      |      |     |     |     |
| Fort Reliance                | X   |     |      |      |      |     |     |     |
| Fort Resolution              | X   | X   |      |      |      |     |     |     |
| Fort Simpson                 | —   | X   |      |      | E    |     |     |     |
|                              |     | IP  | IP   |      |      |     |     |     |
| Fort Smith                   | X   | X   |      |      |      |     |     |     |
| Fort Wrigley (See Wrigley)   |     |     |      |      |      |     |     |     |
| Franklin (See Fort Franklin) |     |     |      |      |      |     |     |     |
| Frobisher                    | X   | X   | IP   |      |      |     |     |     |
| Fort George                  |     |     |      |      |      |     | X   |     |
| Fort Chimo                   |     |     |      |      |      |     | X   |     |
| Frenchman's<br>Island        |     |     | B    |      |      |     |     |     |
| Fox Harbour                  |     |     | B    |      |      |     |     |     |
| Gjoa Haven                   | —   | X   |      |      |      |     |     |     |
| Grise Fiord                  | —   |     | P    | E    |      |     |     |     |
| George's Cove                |     |     | X    |      |      |     |     |     |
| Goose Bay                    |     |     | X    |      |      |     |     |     |
| Great Whale<br>River         |     |     |      |      |      |     | X   |     |
| Hall Lake (FOX)              | —   | DL  |      |      |      |     |     |     |
| Haines Jct.                  | —   | X   |      | E    |      |     |     |     |
| Hay River                    |     | IP  |      | E    |      |     |     |     |
|                              |     | X   |      |      |      |     |     |     |
| Henley Harbour               |     |     | X    |      |      |     |     |     |
| Herschel Island              | —   |     |      | E    |      |     |     |     |
| Holman Island                | —   | X   |      |      | B    |     |     |     |
| Igloolik                     | —   |     | X    |      | B    |     |     |     |
| Inuvik                       | IP  | X   |      | E    |      |     |     |     |
|                              | X   |     |      |      |      |     |     |     |
| Isachsen                     | X   |     |      |      |      |     |     |     |
| Ivugivik                     |     |     |      |      |      |     | X   |     |
| Jean Marie River             | —   | X   |      |      |      |     |     |     |
| King William<br>Land         |     |     |      |      | B    |     |     |     |
| Knob Lake                    |     |     | X    |      |      |     |     |     |
| Koartak                      |     |     |      |      |      |     | X   |     |
| Lac La Martre                | —   | P   |      |      |      |     |     |     |

TABLE 9F-3 continued

|                                    | DOT | CNT | BELL | RCMP | HBCO   | DIA | DNH | DNR |
|------------------------------------|-----|-----|------|------|--------|-----|-----|-----|
| Lady Franklin<br>Point             | —   | X   |      |      |        |     |     |     |
| Lake Harbour                       | —   |     | P    |      | B      |     |     |     |
| L'Anse au Loup                     |     |     | X    |      |        |     |     |     |
| Leaf Bay                           |     |     |      |      |        |     | X   |     |
| Lodge Bay                          |     |     | X    |      |        |     |     |     |
| MacKay Lake<br>(Tourcanis<br>Mine) | —   | X   |      |      |        |     |     |     |
| Mayo                               | —   | X   |      | E    |        |     |     |     |
| Mould Bay                          | X   |     |      |      |        |     |     |     |
| Main                               |     |     | X    |      |        |     |     |     |
| Makkovik                           |     |     | X    |      |        |     |     |     |
| Manouane                           |     |     | X    |      |        |     |     |     |
| Mary's Harbour                     |     |     | X    |      |        |     |     |     |
| Nahanni                            | —   | X   |      |      |        |     |     |     |
| Nottingham<br>Island               | X   |     |      |      |        |     |     |     |
| Obedjiwan                          |     | X   |      |      |        |     |     |     |
| Old Crow<br>(Yukon)                | X   |     |      | E    |        |     |     |     |
| Padley                             | —   |     |      |      | Closed |     |     |     |
| Padloping                          | —   |     | P    |      |        | B   |     |     |
| Pangnirtung                        | —   |     | X    |      | B      |     |     |     |
| Pallette Lake                      |     | X   |      |      |        |     |     |     |
| Pelly Bay                          | —   | P   |      |      |        |     |     |     |
| Perry River<br>(Island)            | —   | X   |      |      | B      |     |     |     |
| Pine Point                         | —   | X   |      |      |        |     |     |     |
| Pond Inlet                         | —   |     | X    |      | B      |     |     |     |
| Port Brabant                       | —   |     |      |      | B      |     |     |     |
| Port Burwell                       |     |     | X    |      |        |     |     |     |
| Port Radium                        | —   | X   |      |      |        |     |     |     |
| Paint Hills                        |     |     |      |      |        |     | X   |     |
| Packs Harbour                      |     |     | X    |      |        |     |     |     |
| Paradise River                     |     |     | X    |      |        |     |     |     |
| Payne Bay                          |     |     |      |      |        |     | X   |     |
| Pitts Harbour                      |     |     | X    |      |        |     |     |     |

Table 9F-3 continued

|                                                                | DOT | CNT | BELL | RCMP | HBCO | DIA                                    | DNH | DNR |
|----------------------------------------------------------------|-----|-----|------|------|------|----------------------------------------|-----|-----|
| Port Nouveau,<br>Quebec                                        |     |     |      |      |      |                                        | X   |     |
| Povungnituk                                                    |     |     |      |      |      |                                        | X   |     |
| Port Hope<br>Simpson                                           |     |     | X    |      |      |                                        |     |     |
| Post ville                                                     |     |     | X    |      |      |                                        |     |     |
| Port Harrison                                                  |     |     |      |      |      |                                        | X   |     |
| Rae                                                            | -   | X   |      |      |      |                                        |     |     |
| Read Island                                                    |     |     |      |      |      |                                        |     |     |
| Rankin Inlet                                                   |     |     |      |      |      | (X)<br>DIA will<br>operate<br>for Bell |     |     |
| Reindeer Depot<br>(Station)                                    | -   | X   |      |      |      |                                        |     |     |
| Repulse Bay                                                    | -   |     | P    |      |      | B                                      |     |     |
| Resolute Bay                                                   | B   |     | X    |      |      |                                        |     |     |
| Resolution<br>Island                                           | X   |     |      |      |      |                                        |     |     |
| Rocher River                                                   | -   | X   |      |      |      |                                        |     |     |
| Ross River                                                     | -   | X   |      |      |      | B                                      |     |     |
| Red Bay                                                        |     |     | X    |      |      |                                        |     |     |
| Rigolet                                                        |     |     | X    |      |      |                                        |     |     |
| Rupert's House                                                 |     |     | X    |      |      |                                        |     |     |
| Sachs Harbour                                                  | X   | X   |      | E    |      |                                        |     |     |
| Snag                                                           | -   | X   |      |      |      |                                        |     |     |
| Snare River                                                    | -   | X   |      |      |      |                                        |     |     |
| Snowdrift                                                      | -   | X   |      |      |      | B                                      |     |     |
| Southampton Island<br>(12 miles from Carol<br>Harbour Airport) | X   |     |      |      |      |                                        |     |     |
| Spence Bay                                                     | -   | P   |      |      |      | B                                      |     |     |
| Smokey                                                         |     |     | X    |      |      |                                        |     |     |
| Sona Lake                                                      |     |     | X    |      |      |                                        |     |     |
| Spotted Island                                                 |     |     | X    |      |      |                                        |     |     |
| Sugluk                                                         |     |     |      |      |      |                                        | X   |     |
| Square Island                                                  |     |     | X    |      |      |                                        |     |     |

Table 9F-3 continued

|                      | DOT | CNT | BELL | RCMP | HBCO                                                                   | DIA    | DNH | DNR |
|----------------------|-----|-----|------|------|------------------------------------------------------------------------|--------|-----|-----|
| Taltson River        | —   | X   |      |      |                                                                        |        |     |     |
| Tavani               | —   |     |      |      |                                                                        | Closed |     |     |
| Teslin               | —   | X   |      | E    |                                                                        |        |     |     |
| Thom Bay             | —   | P   |      |      |                                                                        |        |     |     |
| Tuktoyaktuk          | —   | P   |      | E    |                                                                        |        |     |     |
| Wakeham Bay          |     |     |      |      |                                                                        |        | X   |     |
| Watson Lake          | —   | X   |      | E    |                                                                        |        |     |     |
| Whale Cove           | —   |     |      |      | (X)<br>(Also<br>Oblate<br>Mission)<br>DIA will<br>operate<br>for Bell. |        |     |     |
| Whitehorse           | —   | X   |      | E    |                                                                        |        |     |     |
| Wonowon              | —   | X   |      |      |                                                                        |        |     |     |
| Wrigley<br>(Village) | —   | X   |      | B    |                                                                        |        |     |     |
| Wrigley Airport      | —   | X   |      |      |                                                                        |        |     |     |
| Yellowknife          | X   | X   |      | E    |                                                                        |        |     |     |

N.B. In various settlements, local operation of telephone communications is carried out by an interdepartmental system for federal use. The public can use this system for only 2 hours at a time.

**TABLE 9F-3**  
**COMMERCIAL TELEPHONE SERVICE NORTH OF 60**

Legend

|      |                                                         |
|------|---------------------------------------------------------|
| X    | — in place — designated carrier                         |
| P    | — Proposed agency                                       |
| DL   | — Via DEWline                                           |
| IP   | — Interchange Point                                     |
| E    | — Emergency Traffic only                                |
| B    | — Private Stn. — May handle messages for others         |
| DOT  | — Department of Transport                               |
| CNT  | — Canadian National Telecommunications                  |
| BELL | — Bell Canada                                           |
| RCMP | — Royal Canadian Mounted Police                         |
| HBCO | — Hudson Bay Company                                    |
| DIA  | — Department of Indian Affairs and Northern Development |
| DNR  | — Quebec — Department of Natural Resources              |
| DNH  | — Department of National Health and Welfare             |





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| Geography and Climate . . . . .                          | 9G-14.1   |
| Permafrost . . . . .                                     | 9G-14.1.1 |



## NORTH OF 60 BIBLIOGRAPHY

The following bibliography is a representative list of recent publications related to the resource and economic development of the Yukon and Northwest Territories. Unless otherwise indicated, enquiries may be directed to:

Librarian,  
Department of Indian Affairs and  
Northern Development,  
400 Laurier Ave.,  
Ottawa 4, Ontario.

### **9G-1.1 General**

- |                                    |                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ARCTIC</b>                      | Published by the Arctic Institute of North America, 3458 Redpath St., Montreal 25, P.Q. This journal contains technical and scientific articles, short summaries of field work, and notes on research in the Arctic and Antarctic. Published four times a year.                                                                                           |
| <b>ARCTIC BIBLIOGRAPHY</b>         | This work now runs into 13 volumes and contains references to 69,455 publications on the Arctic. Each publication is listed under the author's name, and a short summary of what it deals with is given. At the end of each volume, an index lists the subjects of the publications. This bibliography covers works in all languages. Published annually. |
| <b>ARCTIC CIRCULAR</b>             | Published by the Arctic Circle, Ottawa. Includes information on northern research projects and developments. Published quarterly.                                                                                                                                                                                                                         |
| <b>BEAVER</b>                      | Published by the Hudson's Bay Company, Hudson's Bay House, Winnipeg 1, Man. This magazine features popular and historical articles on the Canadian West and the North. Published four times a year.                                                                                                                                                       |
| <b>CANADIAN GEOGRAPHIC JOURNAL</b> | This magazine, published by the Royal Canadian Geographical Society, 54 Park Avenue, Ottawa 4, frequently features articles on the Canadian Arctic. Published monthly.                                                                                                                                                                                    |
| <b>NORTH</b>                       | Published by the Queen's Printer for the Northern Administration Branch, Department of Indian Affairs and Northern Development. This magazine contains popular articles on the North. Published every two months.                                                                                                                                         |
| <b>POLAR RECORD</b>                | Published by the Scott Polar Research Institute, Cambridge, England. This publication contains technical and scientific articles and papers, short summaries of the work of polar expeditions and a bibliography. Published three times a year.                                                                                                           |

## 9G-2.1 SOCIO-ECONOMIC STUDIES – Northwest Territories

Following are selected socio-economic studies pertaining to the Northwest Territories conducted by the Department of Indian Affairs and Northern Development.

### 2.1.1 Northern Science Research Group

|                               |                                                                                                           |
|-------------------------------|-----------------------------------------------------------------------------------------------------------|
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| Honigmann, J.J.               | Foodways in a Muskeg Community, 1962                                                                      |
| Jenness, R.A.                 | Great Slave Lake Fishing, 1963                                                                            |
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| Mailhot, J.                   | Inuvik Community Structure – Summer 1965                                                                  |
| Parker, V.J.                  | The Planned Non-Permanent Community, 1963                                                                 |
| Parsons, G.                   | Attitudes of Inuvik Transient Residents, 1969                                                             |
| Smith, G.H.                   | Territorial Sovereignty in the Canadian North, 1963                                                       |
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| Wolfforth, J.R. | The Mackenzie Delta - Changes in Human Ecology, 1969                         |

An abstract entitled "Social Science Research Abstracts, 1959-1965", prepared by the Northern Science Research Group of the Department of Indian Affairs and Northern Development in 1966 covers most of the subjects listed above.

Enquiries for the above publications should be referred to:

Chief, Northern Science Research Group,  
Department of Indian Affairs and Northern Development,  
400 Laurier Ave. W.,  
Ottawa 4, Ontario.

#### 9G-2.1.2 Advisory Committee on Northern Development

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These reports are available from:

Information Services Division,  
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400 Laurier Ave. W.,  
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Enquiries for the above publications should be referred to:

Industrial Division,  
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400 Laurier Ave. W.,  
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### **9G-2.1.4 Northern Economic Development Branch**

|                                       |                                                                                                                                            |
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9G-8.1

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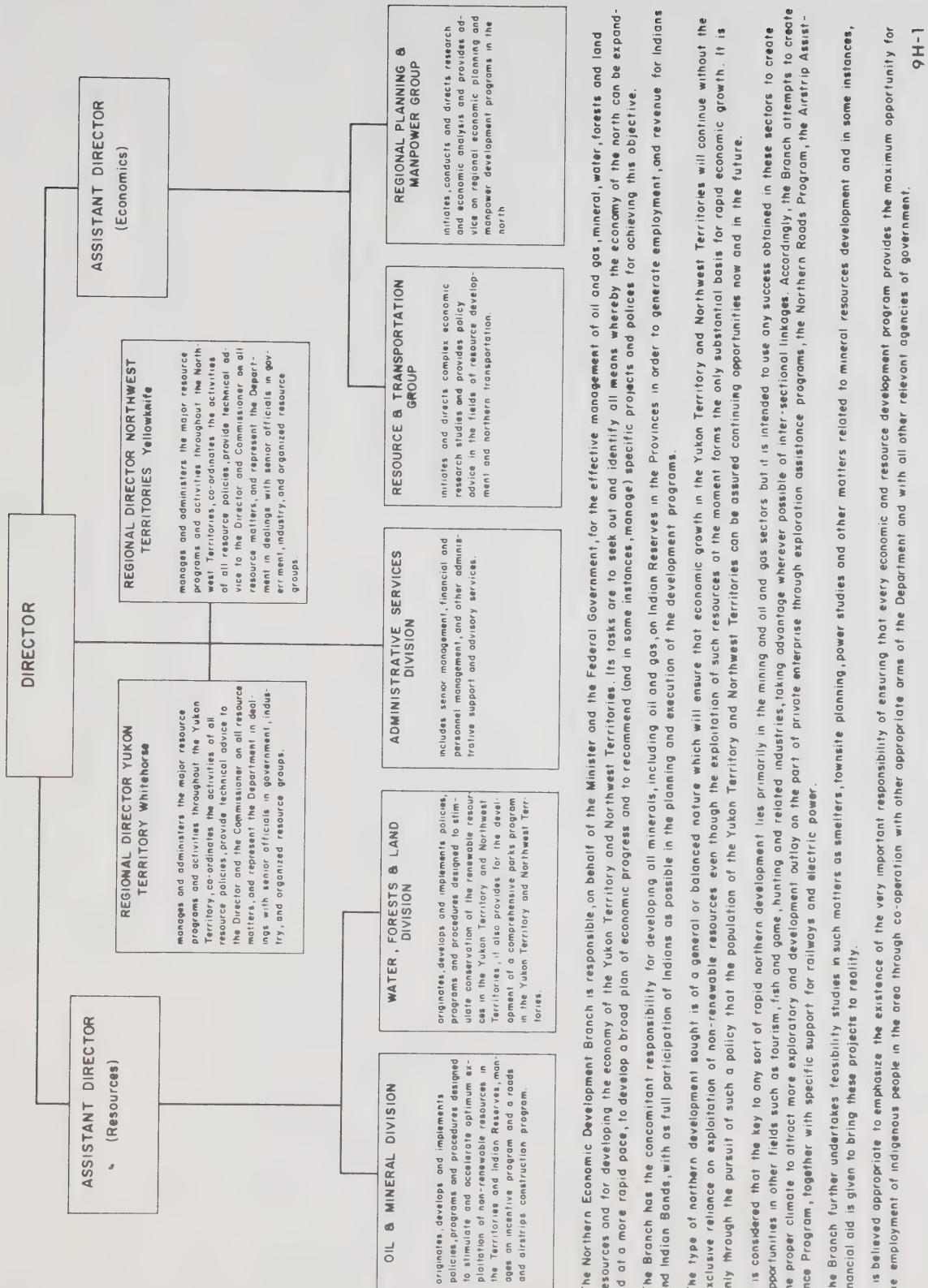
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The Northern Economic Development Branch is responsible, on behalf of the Minister and the Federal Government, for the effective management of oil and gas, mineral, water, forests and land resources and for developing the economy of the Yukon Territory and Northwest Territories. Its tasks are to seek out and identify all means whereby the economy of the north can be expanded at a more rapid pace, to develop a broad plan of economic progress and to recommend (and in some instances, manage) specific projects and policies for achieving this objective.

The Branch has the concomitant responsibility for developing oil minerals, including oil and gas, on Indian Reserves in the Provinces in order to generate employment, and revenue for Indians and Indian Bands with as full participation of Indians as possible in the planning and execution of the development programs.

The type of northern development sought is of a general or balanced nature which will ensure that economic growth in the Yukon Territory and Northwest Territories will continue without the exclusive reliance on exploitation of non-renewable resources even though the population of such resources at the moment forms the only substantial basis for rapid economic growth. It is only through the pursuit of such a policy that the population of the Yukon Territory and Northwest Territories can be assured continuing opportunities now and in the future.

It is considered that the key to any sort of rapid northern development lies primarily in the mining and oil and gas sectors but it is intended to use any success obtained in these sectors to create opportunities in other fields such as tourism, fish and game, hunting and related industries taking advantage wherever possible of inter-sectional linkages. Accordingly, the Branch attempts to create once Program, together with specific support for railways and electric power.

The Branch further undertakes feasibility studies in such matters as smelters, townsite planning, power studies and other matters related to mineral resources development and in some instances, financial aid is given to bring these projects to reality.

It is believed appropriate to emphasize the existence of the very important responsibility of ensuring that every economic and resource development program provides the maximum opportunity for the employment of indigenous people in the area through co-operation with other appropriate arms of the Department and with all other relevant agencies of government.



## OIL & MINERAL DIVISION

Responsible for the management of oil and gas and mineral lands and rights in the Yukon Territory and Northwest Territories, the development and recommendation of policies to encourage and assist industry to exploit these resources, and the development and recommendation of policies relating to industrial and mining safety, as well as the administration of all statutes and policies related to the above.

Responsible for developing all minerals, including oil and gas, on Indian Reserves in the Provinces in order to generate employment and revenue for Indians and Indian Bands, with as full participation of Indians as possible in the planning and execution of the development programs.

Responsible for initiating, implementing and maintaining policies and development programs and projects designed to stimulate the exploration for major non-renewable resources in the Yukon Territory and Northwest Territories, conducts technical feasibility studies on a continuing basis relating to potential major resource development; advises on the relevancy and feasibility of Territorial road and airport construction and transportation generally.

### (INDIAN) MINERAL SECTION

in co-operation with Indian Band Councils and Advisory Councils, provide for the development and production of minerals on Indian Reserves in the provinces to ensure maximum revenue for Indian Bands; to train and provide experience for Indians in the management and development of their mineral resources; to train Indians for employment in the petroleum and mining industries.

### MINING SECTION

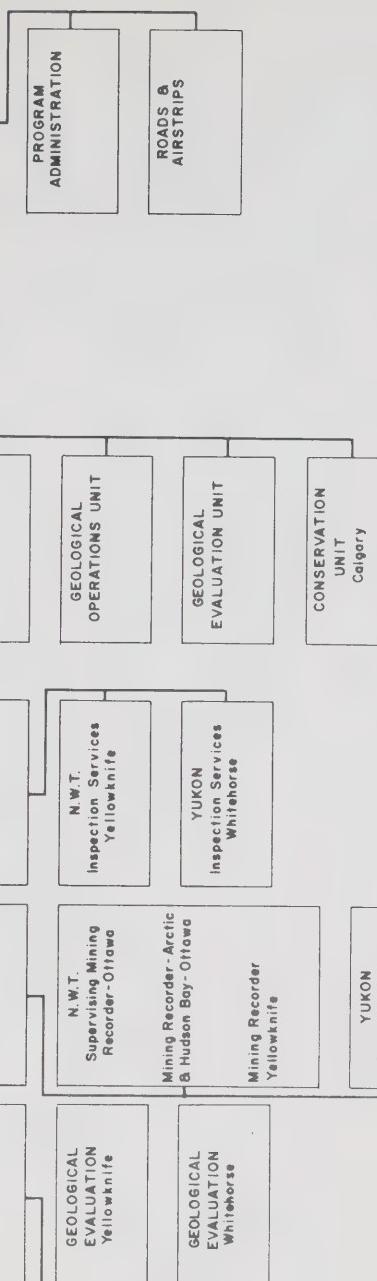
manages and administers minerals and mineral rights (excluding oil and gas) in the Yukon Territory and the Northwest Territories; regulates, encourages mineral exploration and development; initiates and administers safety legislation and ordinances in relation to mineral extraction industries.

### OIL & GAS SECTION

administers oil and gas rights in the Yukon Territory and Northwest Territories; regulates, manages and encourages the production and development of oil and gas on these lands; protects the public interest, both in the disposition rights and in the introduction of adequate conservation measures.

### DEVELOPMENT ANALYSIS

initiates, implements and maintains policies, development projects and an incentive program designed to stimulate the exploitation of major non-renewable resources in the Yukon Territory and Northwest Territories; conducts feasibility studies related to potential major resource development; advises on the relevancy and feasibility of Territorial road and airport construction and of Northern Mineral Development Assistance Grants program.





**WATER FORESTS & LAND DIVISION**

Responsible for the protection, management and disposal of forest land in the Yukon Territory and the Northwest Territories and for the encouragement of the forest industry, together with the development of a comprehensive northern parks program in both Territories.

**WATER RESOURCES SECTION**

Responsible for northern water resources and for the development of appropriate water rights and water pollution control legislation; the initiation of special studies into hydro-electric generating and demand potential in both Territories, and in co-operation with other Federal Departments, to expand water resource investigations and data collecting networks.

**FORESTRY SECTION**

Responsible for the management and administration of Territorial lands, together with the residual Federal interests in public lands in southern Canada in order to bring such lands into maximum productive use.

#### WATER RESOURCES SECTION

develops and maintains an optimum "water" policy that will provide for the conservation and development of northern water resources by implementing appropriate water rights and water pollution control legislation and regulations by co-ordinating and, when necessary, initiating research investigations and special studies into all facets of northern water activities including the potential sites and present and future demands for hydro-electric power development, and based on the results of these studies, develop long-term planning programs to provide for the optimum development and utilization of these water resources.

#### FORESTRY SECTION

manages and administers forest land in the Yukon and Northwest Territories by carrying out existing policies and recommending new policies to meet operating requirements; encourage forest utilization intensity; the degree of forest fire protection and increase effectiveness of protection by introducing protection priorities and developing cost-benefit ratios; develop a comprehensive northern Parks program in both Territories; plan, develop, administer and maintain the campground and roadside picnic sites in both Territories

#### LAND MANAGEMENT

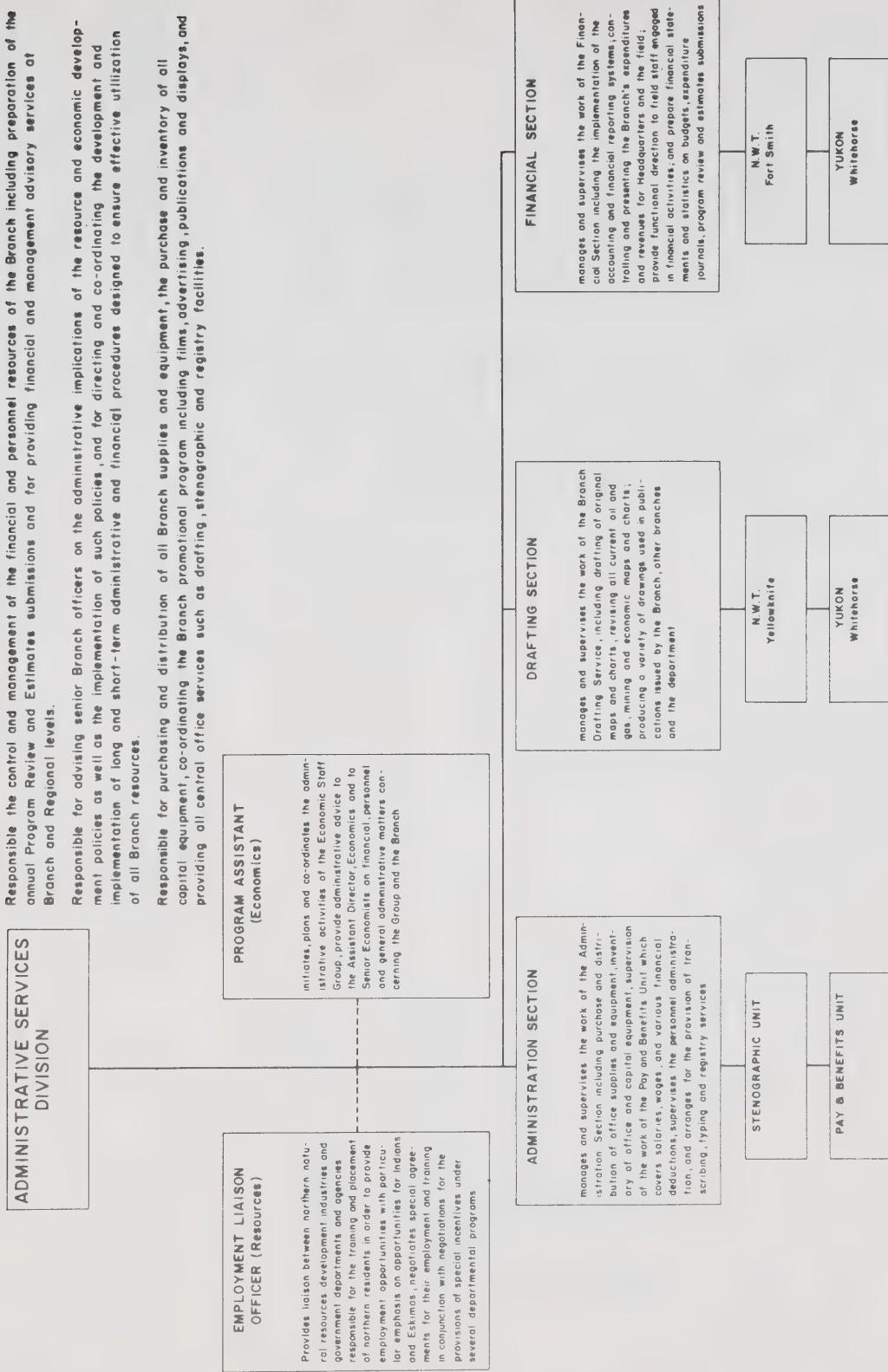
manages and administers dominion and public surface lands in the provinces; originates and develops policies respecting these lands; manages and administers land resources in the Yukon and Northwest Territories by implementing existing policies and recommending new policies to meet operating requirements and the expanding needs of the Territorial Governments particularly the alienation and leasing of land

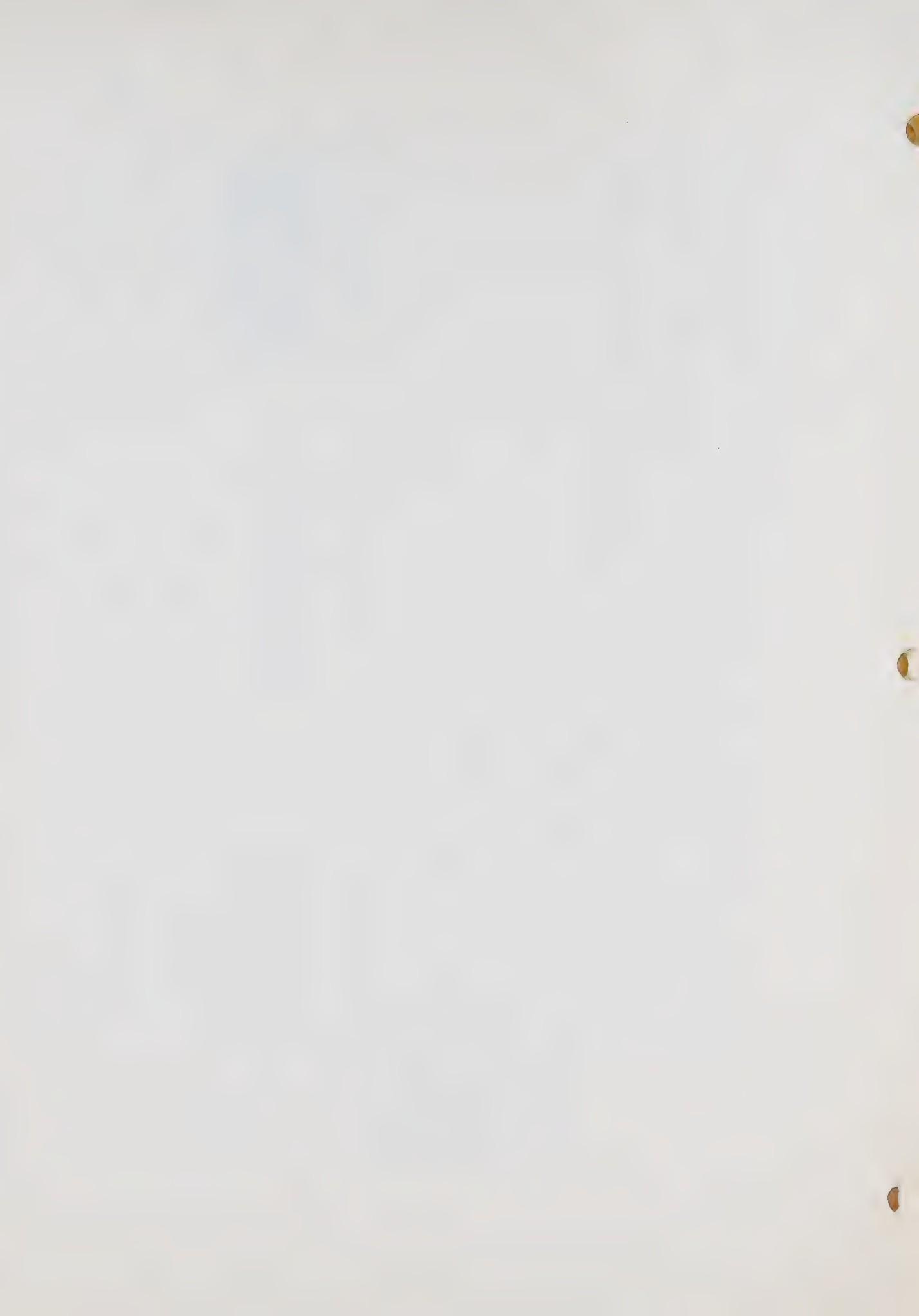


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## ECONOMIC STAFF GROUP

The Economic Staff Group functions to provide economic expertise and policy advice to senior Branch management and other Branches of the Department on matters concerning economic development. In addition to providing a capability within the Department as a whole in econometrics, operations research and other forms of economic analysis, the Division is to originate, develop and implement policies, programs and specific projects designed to accelerate economic development in the Yukon and Northwest Territories.

This includes ensuring that adequate statistics on all factors and segments indicative of the level of economic activity in the Territories are maintained in usable and readily accessible form; analyzing on a current basis economic indicators and producing assessments of economic trends in the Territories; developing policy recommendations and specific projects to expand all phases of the northern economy; undertaking broad and detailed economic studies for the purpose of establishing attainable economic objectives and long term plans.

### REGIONAL PLANNING AND MANPOWER GROUP

Initiates, conducts and directs research and economic analysis and provides advice on regional economic planning and manpower development programs in the north. In regional planning : directs studies and consideration of development of regions, particularly provision of service facilities needed such as education, recreation and retail trade, in regions as a whole, in existing centres or in new centres arising from resource development. In manpower development: initiates and directs research and surveys and economic analysis of alternative ways of developing the northern indigenous population to the point of being able to participate directly in the development both of the north and Canada as a whole.

### RESOURCE AND TRANSPORTATION GROUP

Initiates and directs complex economic research and provides policy advice in the fields of resource development and northern transportation. Resources development: conducts studies and advises on the economics of northern non-renewable resource development projects; provides expertise and directs research as required on renewable resource matters in the Territories and northern national parks. In transportation originates research and provides advice on transportation economics as related to planned or existing resource and industrial projects, including comparisons of modes of transport within specific regions or large areas; conducts studies and advises on technological developments in transportation as these might relate to planning and northern development.

#### REGIONAL PLANNING SECTION

#### MANPOWER SECTION

#### MINERAL RESOURCES SECTION

#### FOREST RESOURCES SECTION

#### TRANSPORTATION SECTION

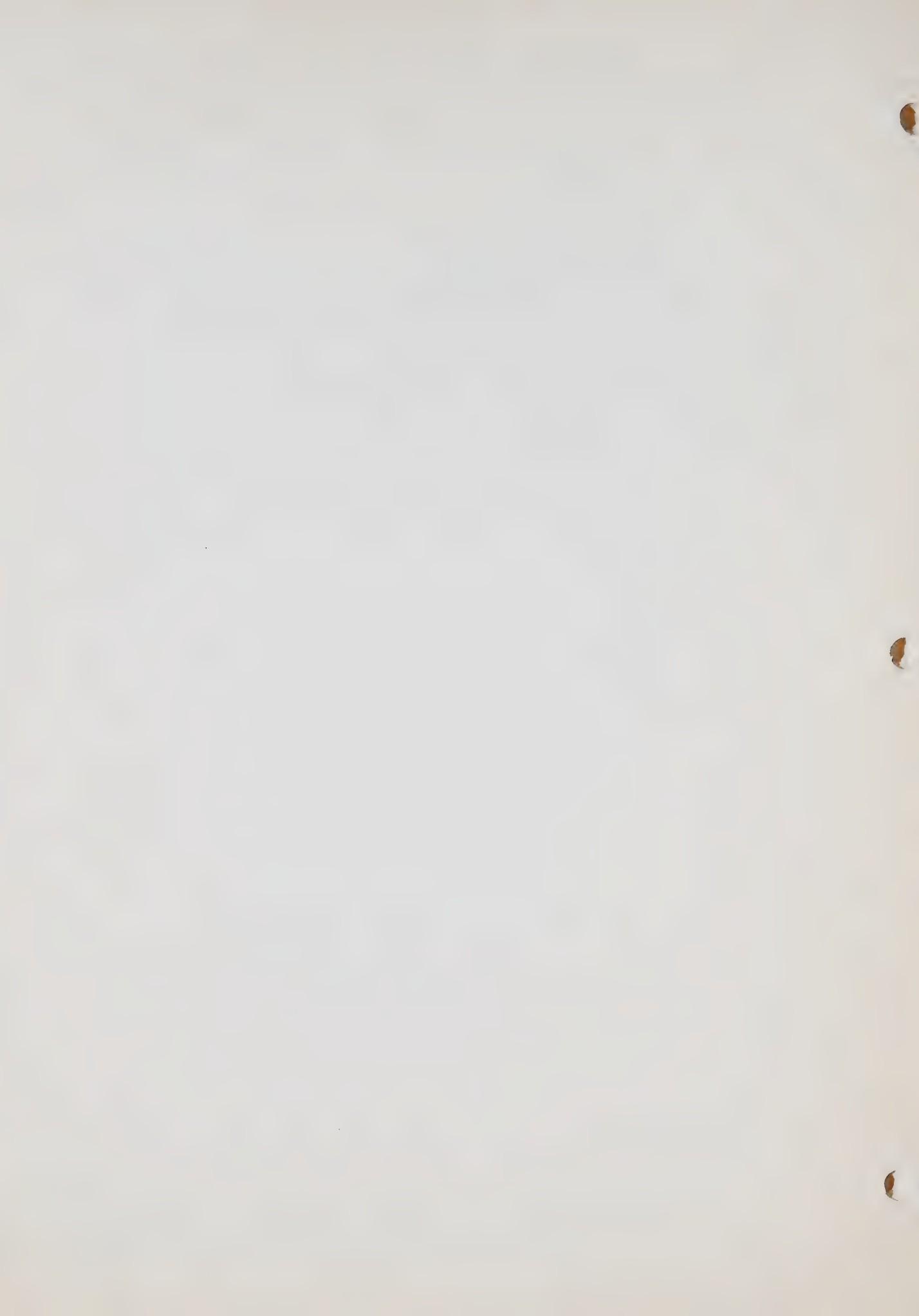




newsletter

north  
of 60

northern economic  
development branch  
department of indian affairs  
and northern development  
government of canada



# CANADA

## north of 60



OCT. - DEC. 1969

### newsletter

on resource and economic development  
in the yukon and the  
northwest territories.  
prepared by the northern economic  
development branch, department of  
~~indian affairs and northern development~~  
government of canada.

Canada's Yukon and Northwest Territories today are the focus of world-wide interest as the tremendous potential of their natural resources is revealed. Interest within the Canadian and international business and investment communities is intense.

It is the responsibility of the Department of Indian Affairs and Northern Development to direct the development of the oil and gas, mineral, water, forests and land resources, and of the economies of the two territories on behalf of the Federal Government.

My Department therefore wishes to provide the business and investment communities, as well as the general public, with the latest information available of interest to the potential investor.

A Prospectus for Resource and Economic Development in the Yukon and the Northwest Territories, containing basic information relative to such development, has been compiled by the Department's Northern Economic Development Branch and is now being distributed.

To complement the Prospectus, my Department is, with this first issue of Canada North of 60, commencing the publication of a quarterly newsletter to provide interested individuals and corporate organizations with the most current information on resource and economic development.

It is our hope that CANADA NORTH OF 60 will be a useful document in our program of encouraging participation in the development of the Yukon and Northwest Territories. The opportunities are plentiful, the challenge great, and the rewards most promising.



Jean Chrétien

### yukon lead-zinc property on production

One of the largest mining operations in Canada is now on production in the heart of the Yukon Territory, 130 miles northeast of Whitehorse.

Anvil Mining Corporation Limited, which began construction on its property in the isolated Anvil Mountains in 1967, is scheduled to start shipping lead and zinc concentrates to two Japanese smelting companies under eight-year sales agreements.

The potential of the operation is so great that in May, with construction nearly complete, Anvil announced an expansion program designed to increase the daily capacity of the concentrator from 5,500 tons to 6,700 tons. This 20% increase will permit production of 460,000 tons of concentrate annually, compared with the originally-planned figure of 370,000 tons.

An extra \$3.5 million will be spent on the expansion program, bringing the total investment to \$63.5 million.



Assured ore reserves on the property are estimated at 63,000,000 tons grading 9% in combined lead and zinc with 1 oz. silver per ton.

The Federal Government has made a substantial contribution to the development of the Anvil project. In addition to paying the full cost of the Ross River - Carmacks road, it paid two-thirds of the cost of the Anvil bridge crossing the Pelly River to provide access to the mine site from the Ross River - Carmacks road.

The Northern Canada Power Commission, a Federal agency, has spent an estimated \$8 million on the

construction of additional power generating facilities at Whitehorse, and a 138KV power line from the Yukon capital to Anvil mine and townsite.

Approximately \$5 million is being spent on the preparation of Faro townsite which, initially will hold a population of around 1,000 - 1,500, and providing essential services, such as sewage disposal, water, hospital, school and firehouses. Over 1.5 million of this cost is being borne by the Territorial Government, which in turn will obtain most of the required capital from the Federal Government.

The Anvil company is owned 40% by Dynasty Explorations Limited of Vancouver, and 60% by Cyprus Mines Corporation, Los Angeles. Opening of the Anvil mine has had an immediate multiplying effect on the Yukon economy. It has resulted in construction by the Federal Government of the new 129-mile, \$9.3 million Ross River - Carmacks road. The route passes through some of the most scenic country in the Yukon, an area of great tourist potential. By cutting across the heart of the Yukon, in an east-west direction, the new highway provides easier access to potentially-rich resource areas.

A further stimulus to the Yukon economy has been provided by Anvil's decision to re-open the coal mine at Carmacks. The mine, formerly operated by the Yukon Coal Company, was in production from 1947 to 1966, supplying coal for river boats on the Yukon River and for plant and heating purposes at the United Keno Hill Mines.

Anvil is re-opening the mine to supply fuel for its coal-fired drying plant. The company expects to use between 10,000 to 12,000 tons of coal each year.

Anvil trucks, which will carry the concentrates overland to Whitehorse for trans-shipment by rail to the ocean terminal at Skagway, Alaska, on the return trip will pick up the coal at Carmacks and transport it back to the mine.

Re-opening of the mine has created new employment opportunities for northern residents.

Occupancy of the Faro townsite by Anvil's mine employees and their families, scheduled for the Fall was set back when a major forest fire, sweeping down the Pelly River in June, roared through Faro, destroying most of the buildings that were either completed or under construction. Re-building operations began almost immediately.

Under its agreement with the Federal Government Anvil Mining Corporation will employ competent local residents, particularly Indians in its mining operations. It is hoped they will represent at least five per cent of the total number of employees within the first year, rising to 10% in the second year, and 25% in the fifth year after the mine comes into production.

The corporation has also agreed to institute a training program for indigenous supervisors and foremen.

Anvil has also agreed to undertake a study aimed at determining the feasibility of constructing a smelter in the area. The study is to be completed within five years of the production start-up date.

If construction of a smelter is shown to be feasible, Anvil will hire indigenous workers for the smelter operations at the same rising ratio as set down for the mining operation.

## mineral exploration in remote areas of N.W.T.

Rights to explore for minerals on 103 prospecting areas covering 18 million acres in the Northwest Territories were granted this year by the Department of Indian Affairs and Northern Development under authority of the Canada Mining Regulations.

The number of permits issued in 1969 exceeded the total number of permits issued since the new regulations were introduced in 1961. From 1961 to April 1, 1969 only 70 permits had been issued. The sudden increase was due primarily to an intensive search for uranium in the eastern Mackenzie District and southern Keewatin District.

The permits are granted to encourage large-scale and well-planned reconnaissance exploration of remote areas on a guaranteed work performance basis. The limited duration of the permit and the release of areas not required for detailed study in the second and third years allows conventional prospecting and staking to resume within a short time.

Major mining firms and oil companies to whom the permits were

granted are committed to spend \$1.8 million in the first year of exploration. Most of this sum, together with a probable \$6 million in the second and third years, will be spent on a large-scale search for uranium in the eastern Mackenzie District, west of Dubawnt Lake, and in the Snowbird and Ennadai Lakes, Kaminak Lake, Tatinnai and Watterson Lakes, Baker Lake and Aberdeen Lake areas of the southern Keewatin District.

Several permits were also granted near the north and south coasts of Baffin Island, where the search will concentrate on metallic mineral possibilities.

## search for sulphur

A hunt for sulphur in the Arctic islands began this year by three exploration companies. Preliminary exploration on Melville and Lougheed Islands began in May by King Resources.

In 1968, the company was issued permits totalling 868,000 acres, on the two islands.

A structure test program was initiated this spring when two small, portable drilling rigs were flown to Melville by Hercules aircraft. The first fourteen Drilling Authorities were issued and by summer the initial program was nearing completion. Depending on the results, the program may be expanded to include several hundred stratigraphic test holes, a gravity survey, and the drilling of large diameter test holes to confirm the subsurface findings.

Two companies, Noble Oils and Axel Heiberg Island Sulphur Syndicate, filed 309 claims on Axel Heiberg Island preliminary to an exploration program.



## electric power potential under survey in north

Surveys of the potential of the Liard River basin north of the 60th parallel, and the watershed of the Dubawnt and Kazan Rivers were undertaken this year, as part of an annual study of the northern water resources, electric power sources.

In sponsoring the survey, the Northern Economic Development Branch is looking for sites that can be developed for generation of hydroelectric power at an economic rate to meet increased requirements in areas currently served or to supply power to entirely new areas. In each case, a

cost comparison is made between thermal (nuclear and fossil fuels) and hydro generation.

Each year a new region is selected for investigation on the basis of its foreseen level of future development. The annual surveys are done in three phases. Data and publications relevant to the study area, including air photos and maps, are first collected and subjected to preliminary analysis. The field portion then follows, during which a surface inspection of potential dam sites is made and river profiles and site control elevations determined by barometric levelling. Finally, a detailed analysis of all data is undertaken, which leads to preliminary designs of site structures, calculations of power potential and cost estimates.

Estimates of power loads in the regions for the next ten years are provided by the Department and by the Northern Canada Power Commission.

In 1967 a region of the Yukon Territory within a 175 mile radius of Carmacks was surveyed, excluding the main stem of the Yukon River. An inventory of 43 potential hydroelectric sites was compiled and a sequence of development outlined to accommodate the anticipated increase in regional power demand. The final report is entitled "Hydro-Electric Resources Survey of the Central Yukon Territory".

The Coppermine River basin and an area between the south shore of Great Slave Lake and the 60th parallel were investigated in 1968. The lower 50 mile reach of the Coppermine River is well suited to hydro development, and was found to be the most economic source of power for a load in this region exceeding 10 megawatts. The Lockhart River between Artillery and Great Slave Lakes is similarly adaptable to hydro development. However, an increase in demand at the Pine Point mine up to approximately 60 megawatts could most economically be met by developing the remaining potential of the Talton River. Hydro development of the Lockhart would be economical for loads within a 250-mile radius of Fort Reliance greater than 5 megawatts, or for loads within a 300 mile radius greater than 50 megawatts. The 1968 report is entitled "Power Survey of the Central Mackenzie District, Northwest Territories". Copies are available from the Water Resources Section.

Copies of the report of the 1969 survey of the Liard River basin and the watershed of the Dubawnt and Kazan Rivers will be available from the Water Resources Section in January, 1970.

All annual surveys to date have been conducted by the Vancouver consulting firm of T. Ingledeew and Associates Limited.

The majority of hydro sites investigated in the Northern Power Study to date would have an installed generating capacity of less than 100 megawatts. Much greater energy levels could be obtained on the main stem of the Yukon River, or by utilizing the 2000 feet of head that would result from diverting portions of the upper Yukon River to tidewater. The Branch is participating in a joint Canada - United States study of the market potential for the over 20 billion kilowatt hours that could be produced annually by hydro development of the upper Yukon River.

## OIL AND GAS

### oil industry studies mackenzie river pipeline

While the search for oil in the Mackenzie River Delta continues, industry is studying the problem of moving oil by pipeline from the northern regions to domestic and international markets.

Operation of a pipeline in permafrost areas presents a special type of problem. Heat generated from an operating line may melt the permanently frozen ground and cause the line to bend and break.

In 1967 a 1,700-foot length of experimental petroleum pipeline was laid near Inuvik, in the delta region, by the research and pipeline divisions of the Imperial Oil Limited Producing Department.

The line is located two miles southeast of Inuvik over varied terrain. It begins on a dry hillside with clay soils, passes under the corner of a lake, crosses an area of high ice content deltaic silt, then runs under a roadway, down a steep slope, across a small creekbed, and ends in a gravel hillside. Various pipeline diameters, depths of burial and types of insulation cover were utilized to evaluate the effects of temperature and strain on the line.

The pipeline is fully instrumented for recording movement, temperature, strain and soil conductivity. The temperature and strain are measured every two weeks by the staff of the Federal Government's Inuvik Research Laboratory at several points along the line.

The pipeline experiments are being carried out in an Arctic climate just within the treeline.

Air temperatures in the region vary between a maximum of 89 degrees above and 70 degrees fahrenheit below zero. In most places the soil temperature at a depth of 10 feet are close to 27 degrees fahrenheit throughout the year.

In a larger project four leading oil companies have recently joined with Trans Mountain Oil Pipe Line Company and Interprovincial Pipe Line Company to determine the technological and economic feasibility of constructing a 1,600-mile line from the North Slope of Alaska through the Yukon and Northwest Territories, to Edmonton where it would connect with existing pipeline systems feeding Canadian and United States' markets.

The new company is known as the Mackenzie Valley Pipe Line Research Limited. The four companies involved are Imperial Oil Limited, Gulf Oil Canada Limited, Shell Canada Limited and Atlantic Richfield Company. The proposed pipeline, which would generally parallel the Mackenzie River, would cross several hundred miles of perma-frost.

Canadian Bechtel Limited will carry out the initial research which will include construction of a 4,000-foot test section of a large diameter pipe near the mouth of the Mackenzie. Various construction techniques will be used to determine the heating effects on the perma-frost. Other potential problems associated with construction of an Arctic pipeline will be studied at the same time, including environmental effects, logistics, personnel resources, pumping station design and construction, support facilities and communication systems, etc.

The study, which is expected to cost about \$1.5 million is to be completed by the end of 1969.

The two research projects are taking place in an area that is under active exploration. In late 1968 and early 1969 three wells were commenced in the Mackenzie River Delta by Imperial Oil — one of which was in partnership with Shell Canada Ltd. and Gulf Oil Canada Ltd. Two wells were drilled and abandoned. Operations of the third well, Tununuk, K-10, which reached below the 11,000 ft. level were terminated in mid-June to take advantage of high water levels in moving the rig to another location.

Drilling programs in the immediate future are planned for the Inuvik area, for the Arctic Coastal Plain, and possibly in the Beaufort Sea in 1970.

### search in the arctic expands

Exploration crews roamed over the Arctic Island wilderness this summer, hot on the trail of what the experts believe to be one of the world's biggest reserves of oil and gas.

J. C. Sproule and Associates of Calgary, carried out a geological program in the Arctic Islands for a number of exploration companies. Pallister and Associates, a division of Kenting Limited began aeromagnetic surveys in the Melville Sound and McClure Strait regions as part of a new exploration program, known as Polarquest.

Polarquest is the third in a series of such programs the firm has undertaken in Northern Canada. A \$20 million combined geology and geophysical program, Polarquest is expected to take four years to complete. Involved is the entire Arctic Islands sedimentary area from the northern part of Baffin and Victoria Islands to the northern tip of Ellesmere Island.

Panarctic Oils, the unique joint exploration project of the Canadian government and private oil and mining firms continued its intensive examination of the Arctic archipelago.

It took two years of planning and research for Panarctic to commence drilling on Melville Island. In 1968, the initial geological-geophysical program was completed at a cost of \$4.1 million. This work consisted of geological field work in the central islands and gravity surveys on Bathurst Island. Initial seismic and gravity work covering 700 miles was carried out in northern Melville Island and Emerald Isle. As a result of the Melville Island program two drilling sites were selected and are being drilled at the present time.

Base camps with airstrips were set up at Winter Harbour, Marie Bay, Sherard Bay, and at Rea Point, all on Melville Island. Stockpiles of fuel and drilling supplies were established at Resolute Bay, Sherard Bay and Rea Point.

The first wells, now drilling in the program, are a 10,000 ft. test at Drake Point L-67, on the Sabine Peninsula in northeast Melville Island, and a 6,000 ft. test at Sandy Point, L-46 in northwest Melville Island.

In May, Panarctic reported that substantial gas flows were encountered below the 3,000 ft. level at the Drake Point well. Gas flows, lost circulation and stuck pipe contributed to major problems which were eventually overcome.

# canada/north of 60

Other Panarctic exploratory plans for 1969 call for geophysical surveys to be carried out in the more northerly islands of the Queen Elizabeth Group.

Drilling will follow these surveys and investigate sub-surface anomalies outlined by the various geophysical tools.

Panarctic's two initial wells are the first of a seventeen-well program which comprises nine deep tests, six intermediate tests, and two shallow tests. Two conventional rigs, modified for aerial transport, were flown to Melville by Hercules aircraft. Transportation of rigs and supplies in the Panarctic project will be by air. All the bulk drilling supplies are moved to the Arctic Islands by barge, from Montreal.



## territorial lands attract corporations, general public

Interest by both the general public and corporations in acquiring interests in lands in the Yukon and Northwest Territories is accelerating. The tourist industry is particularly active, and a number of new leases have been granted for the establishment of sports fishing lodges.

Large subdivision surveys are being completed at Inuvik, N.W.T. and in the vicinity of the Carcross cut-off from the Alaska Highway in the Yukon in order to meet the demand for residential lots. Subdivision surveys will be completed for the first time this year at Clyde River, Chesterfield Inlet and Repulse Bay in the Eastern Arctic. The subdivision survey started in 1968 at Frobisher Bay will be completed this year. Other Eastern Arctic surveys were undertaken this year at Rankin Inlet and Coral Harbour. A number of other subdivision surveys in the Mackenzie District in the Northwest Territories and the Yukon Territory are being co-ordinated with the respective Territorial Governments. Lands are being made available to many of the larger municipalities such as Yellowknife, Hay River and Fort Smith for the development of commercial subdivisions and municipal trailer parks.

With the shortage of ranching lands in the northern sections of the provinces bordering the Northwest Territories, many applications are being received to lease grazing areas. In order to determine the acreage available for this purpose and to help the Branch establish an equitable management program for the ranching industry, feasibility studies are being undertaken in the Liard River basin and Slave River Lowlands areas in co-operation with the Department of Agriculture and the Government of the Northwest Territories. If the studies confirm the estimated potential of these areas the help of private farm and ranching consultants will be sought for expert advice in the development of the management program.

## airport for old crow

Construction of an airport at Old Crow, Yukon Territory, often described as the most isolated mainland settlement in the Canadian North, will begin in 1970.

The 3,300-foot long gravel-surfaced strip, to cost \$600,000 was originally planned for construction in 1973, but the project was brought ahead as a result of the co-operation of the Yukon Government in making heavy equipment available. Machinery and supplies for the project will be moved to the site this winter and construction will begin next May or June.

The airport, to be built by the Territorial Government under the supervision of the Department of Transport, is the second of eleven remote airports to be built under the Federal Government's program which is designed to provide year-around access to communities in the Yukon and the Northwest Territories now isolated for varying periods in spring and fall. The first airport under the program is currently being built at Coppermine, N.W.T., following increased prospecting activity in the region. Additional airports will be constructed at Eskimo Point, Pangnirtung, Aklavik, Pond Inlet, Igloolik, Cape Dorset, Whale Cove, Chesterfield Inlet and Fort McPherson. The remainder of the program is phased over ten years and is expected to cost \$5 million.

Local people employed on a day-labor basis will build the airport at Old Crow. In one of the most north-westerly parts of Canada, Old Crow is located 75 miles north of the Arctic Circle, and 1,400 miles north of Vancouver. Old Crow's population is about 200, the majority being Loucheux Indians engaged mainly in hunting, trapping, and fishing. During

the summer when the Old Crow River is not frozen, aircraft land on the gravel of the dry river bed.



## forest surveys to examine industry development potential

Forest inventory surveys and forestry feasibility studies were conducted this summer by private forestry consultant firms on three major areas North of 60.

These include the Lower Liard River in the Northwest Territories and the Liard and Teslin Forest Units in the Yukon Territory. These surveys will provide basic inventory data, particularly for small timber, and an assessment of forest industry development potential.

The studies reflect the considerable interest being shown by the forest industry in the forest resources of the Territories. Several firms have applied for substantial timber cutting rights, with proposals for large scale integrated operations.

On the basis of up-dated forest inventory data to be obtained this summer, public sustained yield units will be established which will furnish an annual allowable cut of several thousand units each.

When a company wishes to commence a forest operation, it will be granted, based on the merit of its proposal or possibly by tender, a portion of the allowable cut of the sustained yield unit in terms of cutting rights. Depending upon the size of the proposed operation and the total volume available, one or more companies may be granted cutting rights within each unit. Once having cutting rights, a company will negotiate, annually or bi-annually, its particular operating area within the public sustained yield unit.

This system will form the basis of timber disposal policy, and hopefully, will ensure optimal utilization of the forest resource within sound management concepts, hence making adequate provision for future forest requirements. In addition, the Territorial Timber Regulations are to be revised during the year to provide uniform disposal and regulatory policies for all areas.

# CANADA

## north of 60

newsletter

on resource and economic development  
in the Yukon and the  
Northwest Territories.  
prepared by the Northern Economic  
Development Branch, Department of  
Indian Affairs and Northern Development  
Government of Canada.



JAN. - MARCH 1970

### north moves into 70s on wave of development

The Yukon and the Northwest Territories move into the 1970s on the crest of a wave of resource and economic development that has been building up over the last decade.

Spectacular advances in mineral production, in oil and gas exploration and production, combined with the launching of a large-scale forest industry this year indicate a promising new decade North of 60.

Official opening of the giant Anvil base metals mine 130 miles northeast of Whitehorse on January 27 will reduce to a large extent the edge in the value of mineral production the Northwest Territories gained over the Yukon in 1965 when the Pine Point base metals mine went into production on the south shore of Great Slave Lake.

The Northern Economic Development Branch has calculated that with Anvil in production this year the value of mineral production for the Yukon will jump from an estimated \$29 million in 1969, to an estimated \$60 million. Yukon mineral production in 1961 was valued at only \$11.4 million.

Prospects for even greater expansion of mineral production in the Yukon in the 1970s are forecast with the discovery of large deposits of low-grade copper-molybdenum in the Casino Creek area, 100 miles northwest of Carmacks. By the end of 1969 some 10,000 claims were staked in the area which was initially discovered by Brameda Resources Limited and Casino Silver Mines Limited.

The value of mineral production in the Northwest Territories in 1970 has been estimated at \$73 million, an increase of \$3 million over the 1969 estimate. In 1964, just prior to Pine Point, NWT mineral production was valued at \$19.1 million, but in the following year it jumped to \$49.5 million.

The total value of mineral production in both Territories in 1970 is estimated at \$133 million, an increase of approximately 500% over 1961, when the total value stood at \$26.7 million.

Although 1969 figures are not yet available, the extent of oil and gas exploratory expenditures in both territories between 1960 and 1968 indicate the rapid acceleration of interest in this particular resource development. An estimated \$32 million were spent in 1968, compared to only \$11.4 million in 1960, an increase of nearly 300%.

The Department, in providing funds to assist in resource development, communications and transportation services, increased its expenditures in these areas more than four-fold in the last decade. In 1961, specified resource expenditures in the Northwest Territories totalled \$4 million. In 1970 they are expected to total \$16.8 million. Much of this increase is due to the Federal Government's participation in Panarctic Oils Limited, a joint oil exploration venture with private industry in the Arctic Islands. Total expenditures in specified resource areas in the Northwest Territories 1961-70, totalled \$71.1 million.

Similar expenditures in the Yukon increased from \$6 million in 1961 to an

estimated \$8.6 million in 1970. From 1961-70 expenditures in specified resource areas in the Yukon totalled \$65.1 million.

The population growth in both territories, as it relates to the labor force, is also significant. The population of the Northwest Territories in 1969 totalled an estimated 32,000, compared to 22,998 in 1961. In the Yukon the population reached an estimated 16,000 compared to 14,628 in 1961.



The population increases reflect the influx of people to the northern regions. According to the Dominion Bureau of Statistics, the ratio of the Indian native population in the Yukon dropped from 23% in 1965 to 19% in 1969 and the Eskimo native population from 35% to 33%.

The improvement in health conditions in the northern regions, once the major problem, is reflected in the fact that the infant death rate per 1000 births in the Northwest Territories dropped from 111.0 in 1961 to 60.9 in 1968. The national rate in 1968 stood at 23.1, according to the Department of National Health and Welfare. In the same period the crude death rate in the Northwest Territories dropped from 11.4 per 1000 population to 6.6. The national rate in 1968 stood at 7.5.

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Impressive advances in education were registered in both territories during the past decade. In the Yukon territory total enrolment of pupils in schools increased from 2,391 in 1961-62 to 3,617 in 1968-69. The number of Yukon Indian pupils enrolled in schools increased from 411 in 1960-61 to 682 in 1968-69.

In the Northwest Territories, total enrolment of pupils increased from 5,489 in 1961-62 to 8,474 in 1968-69. In the same period, Eskimo enrolment increased from 2,141 to 3,342 and Indian enrolment increased from 1,226 to 1,574.

(Ref. 3-1.1)

## technical – geological service now available in territories

Copies of technical reports submitted as evidence of having performed representation work on mineral claims and prospecting permits in the Yukon and Northwest Territories may now be obtained from the offices of the Resident Geologist at Whitehorse, Y.T., and Yellowknife, N.W.T., as well as from Ottawa, once the report has been removed from the confidential list.

This new service has been made possible by the installation of microfilm reading and printing equipment in the centres.

Available reports can be copied in part or in full for a fee of 35 cents per page and a list of such reports may be obtained by writing:

Chief, Oil and Mineral Division,  
Northern Economic Development  
Branch,

Department of Indian Affairs  
and Northern Development,  
400 Laurier Avenue West,  
Ottawa 4, Ontario. (Ref. 3-2.1)

## northern pioneer finds first oil in arctic

Imperial Oil Limited, a pioneer in northern oil and gas exploration, became the first company to discover oil in the Canadian Arctic. On January 14, oil flowed to the surface at Imperial's Atkinson Point well, 35 miles northeast of Tuktoyaktuk, on the Beaufort Sea.

The oil was found when Cretaceous sands at about the 5,700-foot level were drill stem tested. A younger age of rock than the Devonian beds in which most Western Canadian oil is found, the Cretaceous is a highly prolific source of oil in other parts of the world. The oil was medium-gravity sweet crude.

Commenting on the discovery, Northern Development Minister Jean Chrétien said the discovery would provide great encouragement to other individuals and corporations holding more than 440 million acres under Federal oil and gas exploratory permits. He forecast the discovery would stimulate additional drilling in the Mackenzie Delta region and in the immediate offshore areas.

Atkinson Point, on the Mackenzie River delta is about 400 miles east of Prudhoe Bay, Alaska, site of a major oil discovery in 1967.

Drilling and coring at the well was suspended at a depth of 5,793 feet to permit the well to be cased and to enable logs to be run to gain more information about the thickness and other characteristics of the reservoir.

Discovery of oil at Atkinson Point adds another dimension to the question

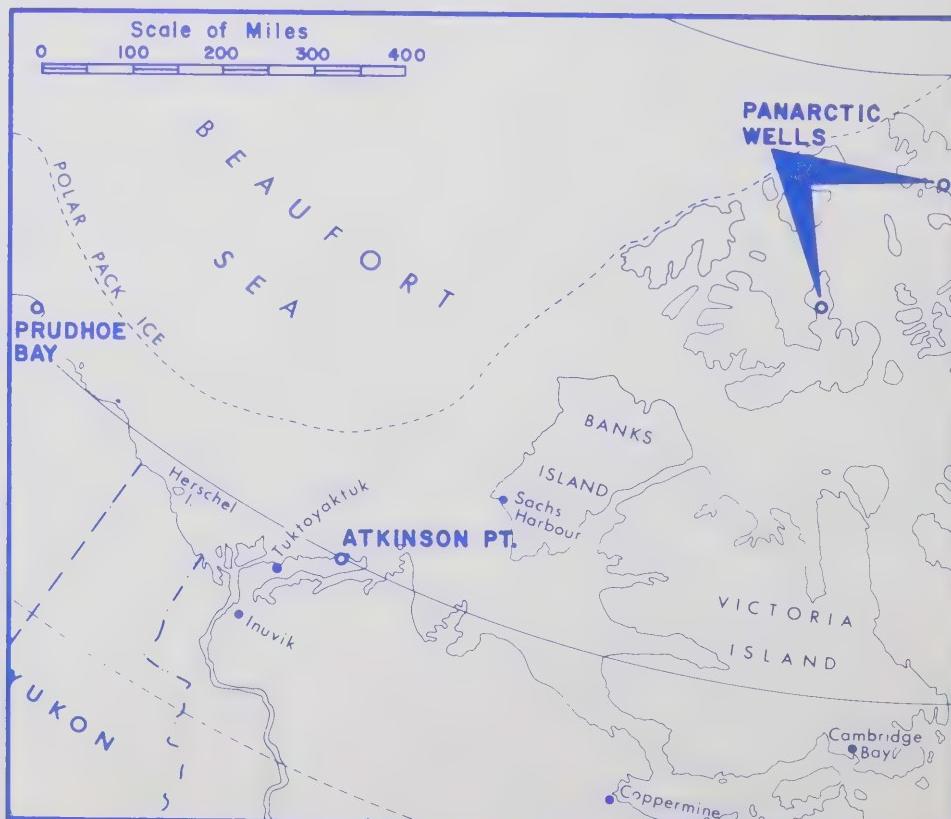
of future transport of oil from the area. Either pipeline, ocean transport or both may be required if the production proves commercially feasible.

Pipeline transport from the region has been under active study for some time. Imperial Oil is one of nine companies in the new Mackenzie Valley Pipe Line Research Limited which is undertaking a feasibility study on the construction of a pipeline running down the Mackenzie river valley to connect with existing pipeline systems feeding Canadian and United States' markets.

The comparatively shallow coastal waters may present major problems with regard to ocean transport. At 1½ miles off shore the waters are only 30 feet deep which means that large ocean-going tankers could not approach shore. At five miles off shore the waters drop to 44 feet.

The waters surrounding Tuktoyaktuk, the only port with any type of docking facilities in the region, are only 20 feet deep, and only shallow-draft vessels can approach the shore.

Oil could be moved by pipeline to a nearby deep water port and the feasibility of constructing a major port on Herschel Island, about 100 miles



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west of Atkinson Point, to serve both Alaskan and Canadian oil fields in the area is the subject of a study now being carried out by the Department of Public Works.

Imperial Oil has been actively searching for oil and gas North of 60 for more than 50 years. In 1920 the Northwest Company, an Imperial subsidiary, discovered the Norman Wells oil field in the Mackenzie river valley. The field is still on production, and last year produced more than 800,000 barrels of crude oil. (Ref. 2-1.1)

## major gas fields found in territories

Establishment of two major gas fields North of 60 has been confirmed by information released by Amoco Canada Petroleum Company Limited at the current hearings of the National Energy Board in Ottawa.

Amoco revealed that proven gas reserves in the Beaver River pool, which straddles the British Columbia-Yukon border, are 1.44 trillion cubic feet. Proven reserves in the Pointed Mountain pool, 25 miles northeast of Beaver River in the Northwest Territories are 1.51 trillion cubic feet with proven and probable reserves totalling 2.27 trillion cubic feet.

The information was presented to the board at the start of hearings on applications from five companies to export an additional 9.5 trillion cubic feet of natural gas from Canada to the United States, over the next 20 to 25 years. One of the applicants, Westcoast Transmission Company Limited has already contracted to bring gas from the Beaver River - Pointed Mountain area and two other applicants, Consolidated Natural Gas Limited and Trans-Canada Pipelines Limited have also indicated an interest. Other applicants being heard are Alberta and Southern Gas Co. Ltd. and Canadian-Montana Pipe Line Company. Amoco has intervened in the applications as a potential buyer.

The hearings, which began in November, are continuing. (Ref. 2-1.1.3)

## government increases panarctic support

The Federal Government has subscribed to additional financing proposed by

Panarctic Oils Limited in the joint government-industry oil and gas exploration program in the Arctic Islands.

The Government's additional financing, amounting in total to \$13.5 million is in proportion to its initial interest, thus maintaining its 45 per cent equity position.

When the Panarctic venture was announced in 1967 the Government put up \$9 million to complement \$11 million raised by a consortium of oil and mining companies. In return for this participation of 45 per cent in the first stage of Panarctic's exploration program, the Federal Government held 45 per cent of the common shares and 45 per cent of the preference shares then issued by the company.

Last Fall Panarctic indicated the need to raise an additional \$10 million. The company intends to give notice this Spring of a need to raise a further \$20 million.

Northern Development Minister Jean Chretien informed the Commons on February 4 that the Government will commit \$4.5 million in respect to the \$10 million financing, and \$9 million in respect to the \$20 million financing. The Government will be issued further preference and common shares in respect to its subscription and thus will maintain its 45 per cent equity interest in Panarctic.

Mr. Chretien indicated that should the Panarctic program be extended and the exploration investment be raised above the aggregate of \$50 million, the Government retains the option of extending its interest pro rata. In addition, the agreement with Panarctic empowers the Government to control the transfer of shares and therefore the degree of Canadian ownership and control in the company.

In continuing its exploration program Panarctic this winter is drilling Canada's most northerly well on Ellef Ringnes Island, in the western Arctic Archipelago, approximately 900 miles north of the Arctic Circle. The well, Panarctic Hoodoo Dome F-27, is located 200 miles north of Drake Point, on Melville Island, site of Panarctic's major gas discovery in its drilling program which began last Spring.

Panarctic plans to drill to a depth of 14,500 feet through an anhydrite dome, the type of structure that has produced substantial quantities of oil and sulphur on the Texas Gulf coast. The prospects are promising. The area covered by Panarctic Hoodoo Dome is 250 square miles. By comparison, the Conroe Dome in Texas, a similar salt dome structure, which has produced 690 million barrels of oil since its discovery in the 1930s, is only 36 square miles in area.

Drilling at the first Drake Point well went to 8,600 feet before mechanical difficulties forced a halt to operations.

In drill stem test gas flowed at the rate of 10 million cubic feet per day from one zone and 13 million cubic feet per day from another.

Drilling on a second Drake Point well, Drake Point K67A adjacent to Drake Point L-67 is continuing. Two other wells, drilled during the 1969 summer season, on the northwestern corner of Melville Island, Panarctic Sandy Point L46 and Panarctic Marine Bay D02, were abandoned when no significant results were uncovered.

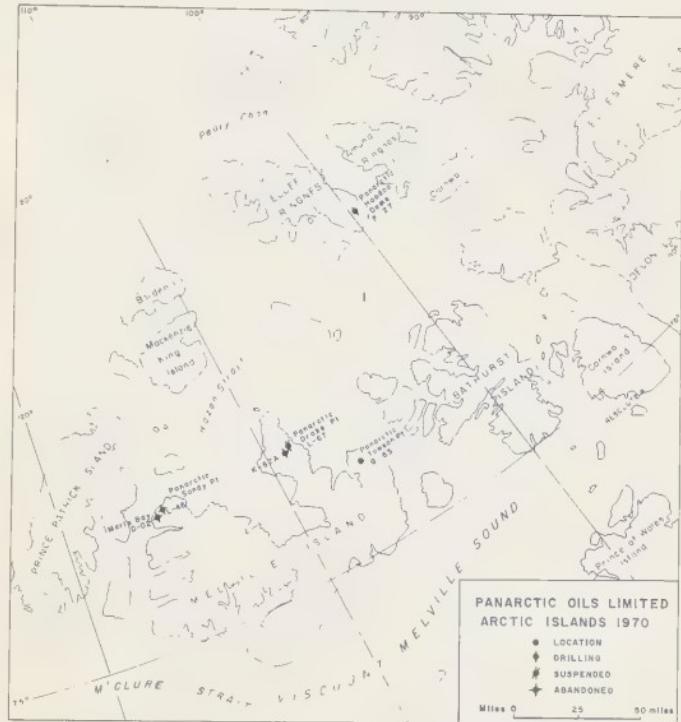
Panarctic will also expand its operations on Melville Island this year by drilling a shallow well at Towson Point, 30 miles southeast of Drake Point.

In the meantime, 14 companies have signed up for 24 exploration Polarquest projects costing \$4.3 million being undertaken by Pallister, a program of geological and geophysical exploration work in the Arctic Islands offered by a group of private consulting firms.

Geophysical work under the program was begun this winter and the geological work will begin this summer.

The high level of exploration and drilling activity in the Mackenzie Delta region on the mainland is continuing, with Imperial Oil Limited currently drilling two new wells in the area, and Elf Exploration and Production, a French company, drilling one. (Ref. 2-1.1.2)

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## two forest areas open for harvesting

Two forest regions in the Yukon and Northwest Territories are to made available for commercial timber harvesting this year, as a result of findings of the forest inventory currently under way by the branch. It has been decided to call for tenders for timber cutting rights in a 600,000 acre tract along the lower Liard River, on the Yukon - Northwest Territories border, which contains substantial volumes of white spruce and in a 1,300,000 acre area between Whitehorse and Teslin, which contains white spruce and lodgepole pine.

Opening up of these areas, in combination with the operations of four forest products companies which signed timber management agreements with the Branch in 1969, is expected to provide the basis for export of northern wood products, in addition to serving a growing local demand.

The calling for tenders marks a departure from previous procedures. As well, under the new system cutting rights will not be tied to a specific area; rather, rights will be extended over the whole of a Timber Harvesting Unit on a volume and location cut basis.

The Branch intends to advertise for tenders and the submission of development proposals later this year. (Ref 5-2.1)

million board feet over a ten-year period. Each company must produce an average of 3 million board feet per year during the first five years and in subsequent years, production must be not less than 3 million board feet per year. Failure to reach and maintain this minimum production may result in reduction of the timber management area.

Stumpage has been set initially at \$2.50 per thousand board feet, with provision for adjustment after five years. Annual occupation and fire protection fee is \$15.80 per square mile. Each agreement is for an initial period of ten years, with provision for renewal for a further ten years.

There is an estimated 77,000 square miles of productive forest in the Yukon and the Mackenzie District of the Northwest Territories containing an estimated 23 billion cubic feet of merchantable timber. Inquiries may be directed to:

Superintendent,  
Yukon Forest Service,  
Box 3206,  
Whitehorse, Y.T.  
Superintendent,  
Mackenzie Forest Service,  
Box 7,  
Fort Smith, N.W.T.

Water, Forest and Land Division,  
Northern Economic Development  
Branch,  
Department of Indian Affairs  
and Northern Development,  
400 Laurier Avenue West,  
Ottawa 4, Ontario. (Ref 5-2.1)



## industry, conservationists help draft regulations

Representatives of the mining and petroleum industries and conservation

groups have worked with the Northern Economic Development Branch through the winter drafting regulations and stipulations governing land-use in the Yukon and Northwest Territories.

The regulations will require all companies and persons undertaking major resource exploration and development in the territories, to apply for a Land Use Permit. The permit will set out regulations to be followed by the company in conducting operations in the various ecological zones in the territories in order to reduce or eliminate damage to the land surface. The regulations will also require that companies using public lands for resource exploration and development pay fees, determined in accordance with a fixed schedule.

At the same time, legislation is being brought forward in Parliament governing water conservation, use and quality control in the Northwest Territories. The proposed legislation is intended to provide for the equitable distribution of surface and ground water rights among the various interested users. The user, in turn, must accept the responsibility for maintaining the quality of the water, or restoring its quality after use to acceptable standards before discharging the water back to the natural environment.

In first announcing the new program, Northern Development Minister Jean Chrétien said that while he was excited by the resource and economic development of the territories, he was also very much aware of the responsibility of government in preserving the delicate ecological balance in the North. The Yukon and the Northwest Territories are at present relatively untouched by industrial pollution and disturbance.

"Still", the minister said, "We have before us from southern Canada and elsewhere a warning, a mounting list of instances of avoidable damage and pollution, instances which often show nothing more than lack of planning, lack of thought by government and industry. I am determined that in the North we shall apply the lessons learned through past mistakes." (Ref. 6-1.1)



## northern labor force aim of employment program

A new program for the development of new employment opportunities in the Yukon and Northwest Territories has been launched by the Northern Economic Development Branch.

The Employment Liaison Program was established in an effort to find more effective ways to increase employment opportunities and to bring together government and industry in the development of good, practical training programs for northern residents, particularly the Indian, Eskimo and Metis people.

Among the first projects undertaken was the establishment of a committee composed of representatives of government and industry to help northern residents find employment in the oil industry.

In November, Northern Development Minister Jean Chrétien, on behalf of the Federal Government, signed an agreement with Cominco Ltd. and the United Steel Workers of America to provide-on-the-job training for northern residents at Cominco's Pine Point Mines, on the south shore of Great Slave Lake. Six special training positions were created initially under the agreement. On successful completion of the course, trainees will be absorbed into Cominco's labor force.

A third project under the Employment Liaison Program involves the training of Eskimos as helicopter pilots. Three Eskimo youths have begun initial training at the Canadian Forces airbase at Borden, Ont. They will undergo two years of flight training, involving both fixed wing aircraft and helicopters in western Canada. This summer they will receive on-the-job training with Okanagan Helicopters Limited of Vancouver. The firm has agreed to provide employment for successful graduates of the program.

Under the terms of the agreement with Cominco the Government of the Northwest Territories established a Vocational Liaison Officer position at Pine Point to provide guidance to the trainees. A Trainee Employment Advisory Committee was established to oversee the selection and training of trainees. The Committee is composed of the Vocational Liaison Officer, a union representative and a company representative.

Cominco agreed to provide each trainee a minimum of 90 days of on-the-job training. In return it is to be reimbursed for up to 50% of the salaries paid to each trainee for up to one year.

As its part of the agreement the union agreed to accept the training period as part of the six-month probationary period.

In addition, Cominco offered to subsidize housing for married trainees, under an agreement with the Territorial Government.

Anvil Mines, under an agreement signed earlier with the Federal Government, has established an on-the-job training program at its new base metals mining operation in the Yukon. Of the first 22 men selected for the program, 14 are Indian. Anvil Coal Mines at Carmacks is also operated by a 12-man Indian crew.

Under the Employment Liaison Program officers stationed in Calgary and Ottawa have the responsibility of establishing and utilizing existing contacts with the resource industries to develop employment opportunities for northern residents.

Employment of northern residents in these industries has hitherto been low. According to one recent survey conducted by the Northern Development Department these workers comprised only 5.2 per cent of the total mine labor force of the Northwest Territories, or 63 men out of a total of 1,182 workers. In the Yukon it was only 3.4 per cent of the total industry work force, or 28 men out of a total of 820.

W. Dingle, Assistant Operations Manager, Imperial Oil Ltd., and chairman of the Calgary-based oil and gas industry employment committee, in urging support for the new program, said in a recent statement that many

older northern residents have never received the educational training that has come to be accepted standards for employment in other regions of Canada. They often do not understand the requirements for steady employment, nor the economic and social conditions surrounding employment opportunities.

"The company planning on working in the North and desirous of giving opportunities to northern residents must be patient and understanding of the background and social upbringing of those it may employ," he said. "The company will have to go to greater lengths to provide the necessary training and to accept lower educational standards. An employee will have to be judged on what he can do and not on to what degree he was formally educated. It will not be a one-sided situation, as many northern employees will be able to bring as their contribution knowledge and understanding of the north country, its terrain, its climate and its problems that cannot be obtained by formal education. Opportunity and training by the employer, assistance and encouragement by the government and desire on the part of the northern should ensure that all have an opportunity to obtain maximum return from our northern regions."

Mr. Dingle added that in terms of economics, it was only sensible for industry to support the development of a trained local labor force that wishes to remain living in the area of operations in the Territories, that understands the problems of the land, and has a strong desire to assist in the development of their homeland.

Further information on the Employment Liaison Program may be obtained from:  
Employment Liaison Officer,  
Northern Economic Development  
Branch,  
Department of Indian Affairs  
and Northern Development,  
400 Laurier Ave. W.,  
Ottawa 4, Ontario  
or  
Employment Liaison Officer,  
Department of Indian Affairs  
and Northern Development,  
112 - 11th Ave. S.E.,  
Calgary 21, Alberta. (Ref. 9A-1.1)

# CANADA

## north of 60

APRIL - JUNE, 1970

**newsletter**

on resource and economic development  
in the Yukon and the  
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prepared by the Northern Economic  
Development Branch, Department of  
Indian Affairs and Northern Development  
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### government legislates to protect environment

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In March, the Government introduced in the Commons the Northern Inland Waters Bill providing for comprehensive management of the freshwater resources North of 60. The legislation ensures that the inland waters will forever remain public property to be used, managed and developed in the interest of the region and the nation as a whole.

Provision is made for the establishment of Territorial Water Boards to grant water licences only on condition that the users accept full responsibility for maintaining or restoring the quality of water to acceptable standards before returning it to the natural environment.

On April 22nd, the House of Commons, voted unanimously in favour of a Government bill designed to further Canada's interests North of 60.

This was the Arctic Waters Pollution Bill which would set a 100-mile safety control zone around the Arctic Islands and is designed to prevent pollution of the areas of the Arctic waters adjacent to the mainland and islands of the Canadian archipelago. Another Bill was passed by the House of Commons to amend the Territorial Sea and Fishing Zones Act which would extend the limits of Canada's territorial sea to 12 miles from three, and would authorize the government, by Order in Council, to create exclusive Canadian fishing zones

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Both Bills were sent to committee for study before being returned to the Commons for third and final reading.

Speaking on the Arctic Waters Pollution Bill, Northern Development Minister Jean Chrétien reiterated the earlier statement of Prime Minister Pierre Elliott Trudeau that Canada has four primary interests in the Arctic: the economic development of the North, the preservation of the ecological balance, the security of Canada and the continued high stature of Canada in the international community.

The two Bills were designed to further these interests and as such are a continuation of past policies of successive Canadian governments.

"The Arctic Waters Pollution Bill is a further important expression of this government's concern for environmental quality in the country in general, and in northern Canada in particular", said Mr. Chrétien. "It is further evidence that Canada is prepared to meet its responsibilities in maintaining and developing the Canadian Arctic".

He said the effect of this new legislation would be to make clear that the Northwest Passage is to be opened for the passage of shipping to all nations subject to the necessary conditions required to protect the delicate ecological balance of the Canadian Arctic.

"This Bill clearly demonstrates to the international community the basis on which Canada, as a coastal state, with its unique responsibilities for protecting the northern environment, will welcome international use of its waters. Investors in Canada's North will now know the rules of the game regarding sea transportation, and I am confident that this

Bill will encourage commercial shipping in the North and the development of our last frontier".

The Bill itself deals with pollution arising from shipping, from land based installations, and from commercial activities such as oil drilling carried out on the continental shelf.

With this legislation, it will be possible, where circumstances warrant, to control the deposit of waste in Arctic waters, or on the islands or mainland under conditions where it may enter these waters. The definition of waste is comprehensive and covers any substances which would degrade or alter the Arctic waters to an extent detrimental to their use by man, or by any animals, fish or plant that are useful to man.



The legislation regarding shipping will effectively be brought into force by the prescription of safety control zones by regulation of the Governor in Council. Within a shipping safety control zone ships will be required to comply with technical requirements relating to hull structure, navigational aids, qualifications of personnel, and time and route of passage. Ships not meeting these requirements will not be permitted to enter the safety control zone. At certain times of the year, or when certain ice conditions prevail, ships may be barred from entering the zone.

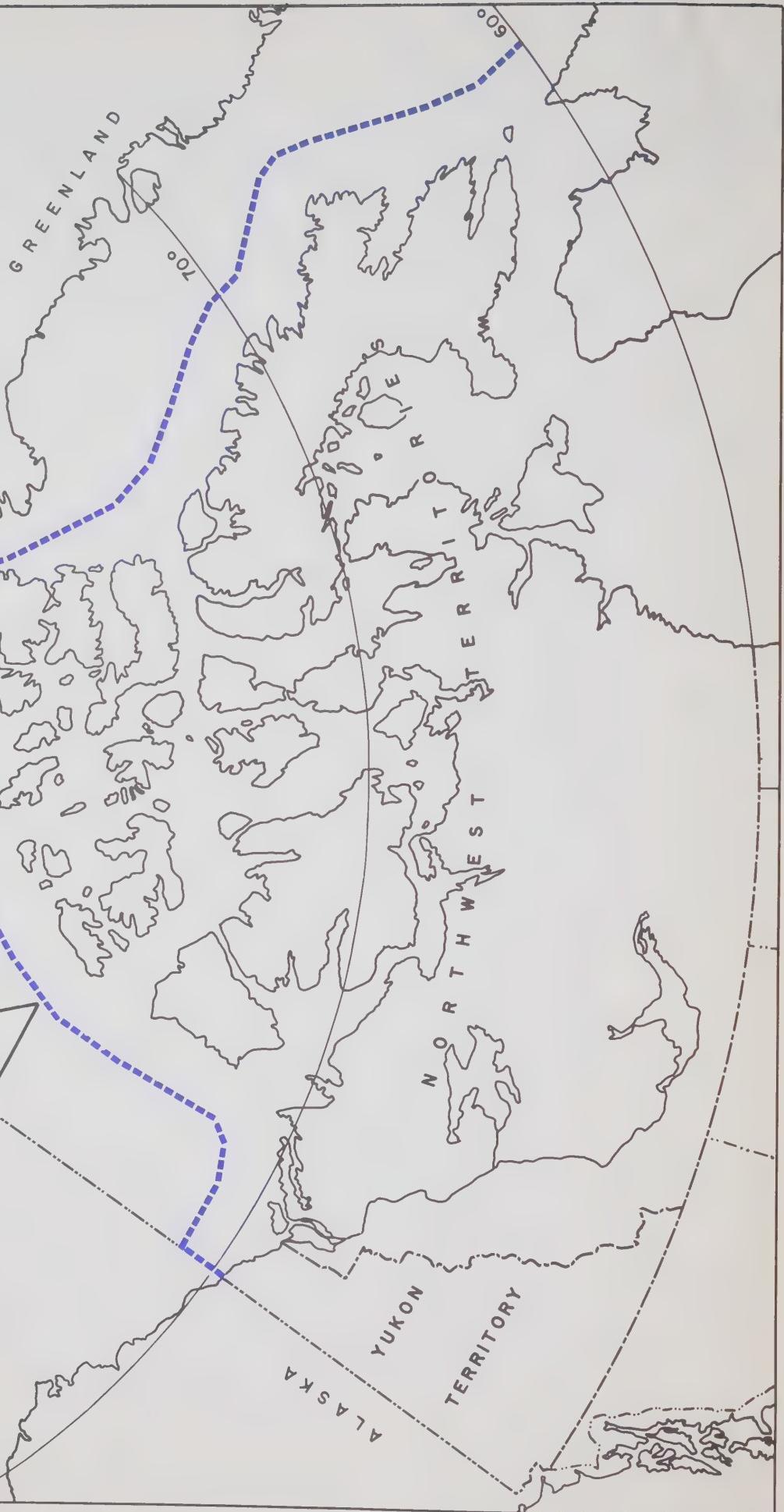
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The pollution prevention officer will perform similar functions with respect to commercial operations carried out on the continental shelf and will also have the authority to both board a ship within a safety control zone for inspection purposes, or to order a ship in or near the safety control zone to remain outside it if he suspects that the ship does not comply with the standards applicable within the zone.

The legislation, while designed to prevent the possibility of pollution occurring, recognizes the danger of serious pollution resulting from accidents or other unforeseen cause. The Bill provides for civil liability resulting from the deposit of waste by persons engaged in exploring, developing or exploiting the natural resources on the land adjacent to the Arctic waters or on the continental shelf, or by persons carrying on any undertaking on the mainland or islands of the Canadian Arctic or on Arctic waters, or by owners of ships navigating in Arctic waters, or owners of cargo on any such ships. This liability is absolute and does not depend on proof of fault or negligence. The Bill also sets out procedures for recovering in Canadian Courts. The Bill provides that the Governor in Council may require evidence of financial responsibility to be provided by these persons

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"With this legislation, we are pioneers on the frontier of international law," Mr. Chrétien told the Commons. "This legislation goes beyond any previous action by the Canadian government for the control of pollution and is in advance of any action by the international community. Although we have taken this action unilaterally, we stand ready at all times to enter into international agreement which will provide for control over the dangers of pollution. Until this occurs, however, we must and will act now to protect the ecology of the north. This Bill is evidence of our determination in this regard."

In introducing the amendments to the Territorial Sea and Fishing Zones Act, External Affairs Minister Mitchell Sharp outlined several reasons why the government wished to extend its territorial sovereignty from 3 to 12 miles. The basic reason is that the limited fisheries jurisdiction which Canada presently exercises over the outer nine-mile zone is no longer sufficient to protect the full range of Canada's vital coastal interests.

It will also permit Canada to expedite the conclusion of negotiations with the European countries which have been permitted to continue their fishing activities in Canada's nine-mile fishing zone, and it will further protect Canada's interests by permitting Canada to exercise greater control over the movement of foreign ships.

The implications of the amendments as they affect Canada's Arctic sovereignty were reflected by the United States which publicly called into question the Canadian view that the waters of the Arctic archipelago are Canadian. Mr. Sharp told the Commons that the government will not abandon the long-standing Canadian position on this question.

He said that since the 12-mile territorial sea is well established in international law, the effect of the new legislation on the Northwest Passage is that Barrow Strait and Prince of Wales Strait, two passages of water vital to any Arctic shipping, are subject to complete Canadian sovereignty. "Whether or not those who disagree with us wish to allege that other waters are not Canadian, they cannot realistically argue any longer concerning these two bodies of water", said Mr. Sharp.



## new regulations to protect land

Mr. Chrétien, addressing the Canadian Transportation Research Forum in Winnipeg on May 4, announced plans for a series of new conservation measures designed to further protect the northern land environment and minimize surface disturbances resulting from exploration, development and transportation north of the 60th parallel

Mr. Chrétien indicated the Government has introduced amendments to the Territorial Lands Act to be followed by the implementation of Land-Use regulations which will give his department a measure of control over the types and methods of northern resource exploration, development and where necessary, reclamation procedures. This Bill, C-212, has passed second reading and is now before parliamentary committee.

Under the regulations, the north will be divided into a number of zones based on biological and ecological sensitivity to disturbance. The regulations, which will be applicable to all zones, will contain provisions relating to survey lines and monuments, highways and roads, campsites and similar land use operations. In addition, there will be detailed zonal stipulations to supplement the general regulations to enable a closer control of land use in a zone as required by its particular environmental conditions.

# canada/north of 60

To implement the regulations in the field, Land Management Areas will be established where resource exploration activity is concentrated, or where there is a special requirement to protect a unique environment. Companies will be required to apply for a Land Use Permit to operate within a Land Management Area. They will submit periodic reports on their land use activities and pay land use fees at a standard rate per acre of land affected during their operations. Users of land outside Land Management Areas will not require a permit, but must adhere to the regulations and applicable zonal stipulations, subject to government inspection.

The Water, Forests and Land Division of the Northern Economic Development Branch has been working for the past year on proposed Land Use Regulations. These regulations will set out operating guidelines to resource exploration and development industries using territorial lands and are intended to prevent needless damage to the far northern environment that sometimes results from such operations.

Northern Oil Explorers Limited of Calgary had planned to carry out a seismic exploration program on the Old Crow Flats in the Northern Yukon Territory during February and March, 1970. The Flats are a particularly sensitive area both from an environmental point of view and as a native hunting and trapping areas. As a result, Northern Oil Explorers was asked and the Company agreed to observe rather strict operating guidelines during the course of their seismic program; in essence, a trial run of the proposed Land Use Regulations program.

The stipulations laid down by the Branch required the Company to use tracked vehicles only, refrain from bulldozing trails, lines or stream crossings except with the expressed approval of the on-site inspector, obtain the inspector's approval for all camp, fuel storage and waste disposal areas, and so on.

Needless to say, these stipulations, put into effect on short notice and strictly enforced, placed a relatively heavy burden on the exploration company, their contractors and subcontractors.

In addition, the cost of the job was considerably higher than was estimated and the work performance was below expectations. However, it is to the credit of Northern Oil Explorers Limited that they accepted these additional responsibilities in good grace and modified their operating techniques to minimize surface damage to this unique and relatively fragile northern region.

Subsequent discussions between the Company and responsible officials in the Northern Economic Development Branch have pointed up the usefulness of this "test run" and will undoubtedly expedite, both from the government's and industry's point of view, the effective implementation and administration of the forthcoming Land Use Regulations.

At the same time, the government has established an Arctic Land-Use Research program (ALUR). Working with an initial budget of \$500,000, ALUR will detect and define environmental problems associated with land-use resulting from northern resource development. Base line information on undisturbed northern ecosystems will provide control data to measure the effects of land-use operations.

ALUR is also expected to come up with alternatives to procedures which result in unacceptable levels of damage to the environment. Researchers will recommend the type and degree of restrictions which must be imposed on northern land-use operations. Their data will be published and distributed to interested industries, governments and universities.

Under the program, three land use research establishments (LURE) will be established. One will be in the boreal forest region of the Liard River basin. The second will be on Richards Island in the sensitive tundra zone of the Mackenzie delta, and the third will be in the precambrian zone between Great Slave and Great Bear Lakes.

Individual researchers and teams from seven Canadian universities will join the 1970 program. Industry is helping with the logistical support. In May, a task force of conservationists and scientists, formed by the Department, travelled to the Mackenzie Delta for a first-hand look at environmental

problems associated with oil and gas exploration in the area. The task force is to make recommendations on land use which could be incorporated into the new Land-Use Regulations and on problems which could become part of the long-range ALUR program.

A final element of the new program is a series of summer field tests of tracked vehicles to take place in the area around Tuktoyaktuk, N.W.T. Scientists and experts will assess the effect of tracked vehicles currently in use on the ecosystem and thermal balance of the tundra.

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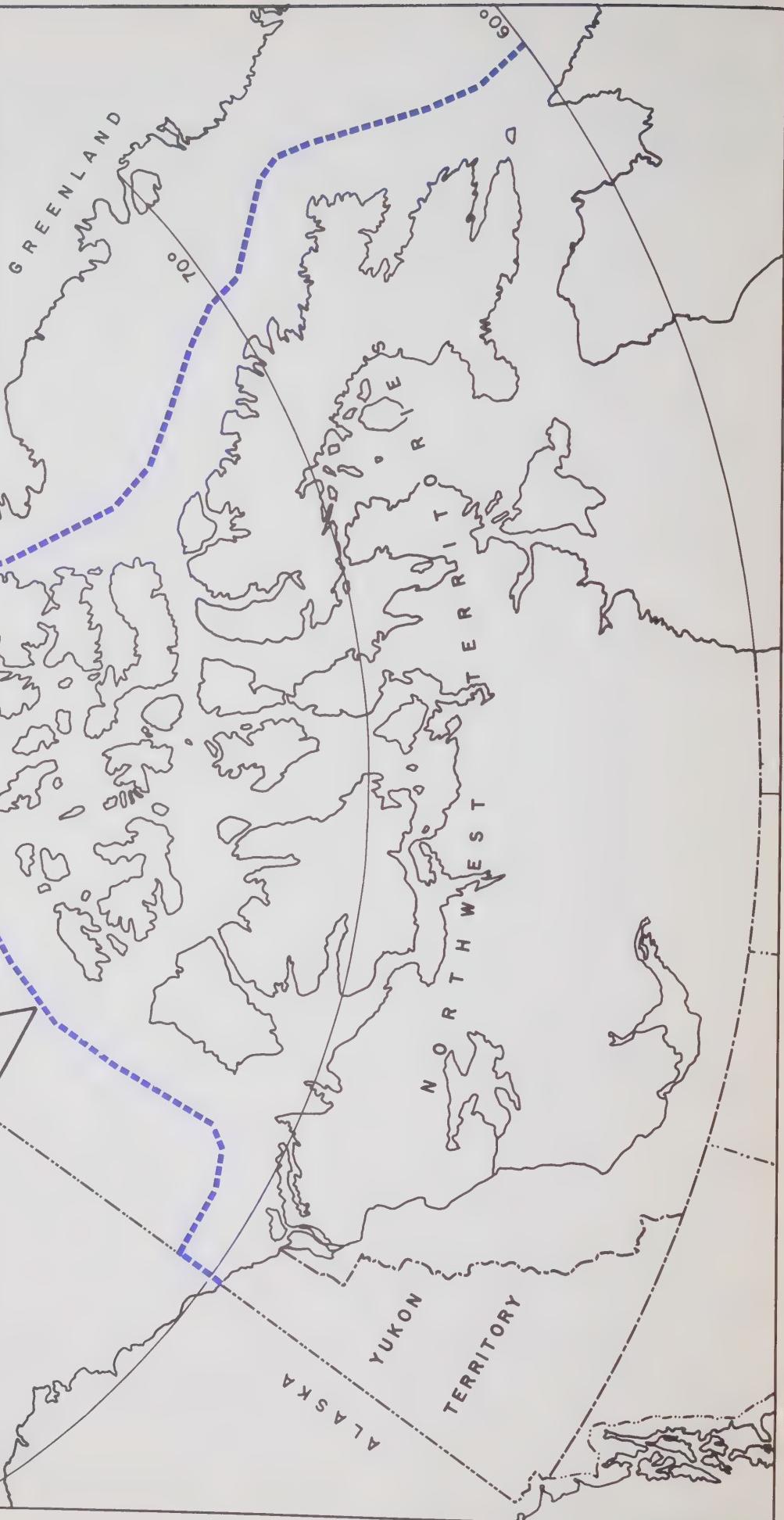
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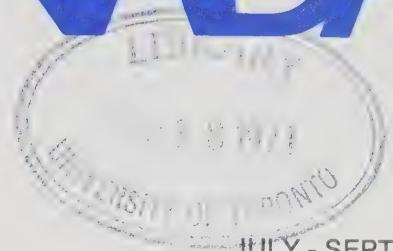


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# CANADA

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JULY - SEPT. 1970

### **northern pipeline guidelines established**

The movement of oil and gas North of 60 to domestic and international markets represents one of the foremost challenges ever faced by both government and industry in the field of resource and economic development.

Whether by land or sea, or a combination of both, the movement of the resource presents new and extremely complex problems. Recent field exercises by ocean-going tankers through the Canadian archipelago to the potentially-rich oil and gas areas of the Northwest Territories and neighboring Alaska raised a number of serious issues such as Arctic sovereignty and the threat of pollution. Parliament and the Federal Government moved quickly earlier this year to resolve these issues through appropriate legislation and regulation. (see April-June issue)

Now, the Federal Government has turned its attention to the potential problems posed by the proposed movement of oil and gas through Northern Canada by pipeline. Already several pipeline and financial groups have come forward with proposals to build gas pipelines from the North Slope of Alaska and the North to Canadian and U.S. markets.

In anticipation of any future decision to transport oil and gas by such methods the Federal Government has established guidelines for pipeline construction and operation North of 60.

The guidelines reflect the Government's policies as they affect northern economic growth and protection of the environment. They were announced jointly on August 13 by Hon. Jean Chrétien, Minister of Indian Affairs and Northern Development, and Hon. J. J. Greene, Minister of Energy, Mines and Resources.

Basically, the guidelines establish requirements ranging from environmental protection, pollution control and Canadian ownership and participation to training and employment of residents of the North in any pipeline or related project.

The new guidelines are as follows:

1. The Ministers of Indian Affairs and Northern Development and Energy, Mines and Resources will function as a point of contact between Government and industry, acting as a Steering Committee from which industry and prospective applicants will receive guidance and direction to those federal departments and agencies concerned with the particular aspects of northern pipelines.
2. Initially, only one trunk oil pipeline and one trunk gas pipeline will be permitted to be constructed in the north within a "corridor" to be located and reserved following consultation with industry and other interested groups.
3. Each of these lines will provide either "common" carrier service at published tariffs or a "contract" carrier service at a negotiated price for all oil and gas which may be tendered thereto.
4. Pipelines in the north, like pipelines elsewhere which are within the jurisdiction of the Parliament of Canada, will be regulated in accordance with the National Energy Board Act, amended as may be appropriate.
5. Means by which Canadians will have a substantial opportunity for participating in the financing, engineering, construction, ownership and management of northern pipelines will form an important element in Canadian government consideration of proposals for such pipelines.
6. The National Energy Board will ensure that any applicant for a Certificate of Public Convenience and

Necessity must document the research conducted and submit a comprehensive report assessing the expected effects of the project upon the environment. Any certificate issued will be strictly conditioned in respect of preservation of the ecology and environment, prevention of pollution, prevention of thermal and other erosion, freedom of navigation, and the protection of the rights of northern residents, according to standards issued by the Governor in Council on the advice of the Department of Indian Affairs and Northern Development.



7. Any applicant must undertake to provide specific programs leading to employment of residents of the north both during the construction phase and for the operation of the pipeline. For this purpose, the pipeline company will provide for the necessary training of local residents in coordination with various government programs, including on-the-job training projects. The provision of adequate housing and counselling services will also be a requirement.

#### **CONTINUING REVIEW**

In their announcement the Ministers indicated that the Federal Government will maintain a continuing review of the proposals for the construction of northern pipelines and has underway a general review of foreign ownership and control. Further guidelines may be issued as a result of such reviews and would apply to all applications for such pipelines.

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The intense interest in oil and gas transport from the North is demonstrated by the development of potential markets in Canada and the U.S. While proven oil reserves on the North Slope of Alaska, in the Prudhoe Bay region, are considerable, they represent only about two or three years of the rapidly increasing U.S. requirements as forecast for the year 1980. The demand for gas in the U.S. is even more acute, with indications of a serious shortage developing in the 1970s unless new reserves can be linked to markets.

U.S. interests are studying the development of a Trans Alaskan pipeline linking the North Slope with the Pacific seaport of Valdez where the oil would be loaded on tankers for transport to the Pacific west coast. However, the most direct pipeline route from Alaska and Northern Canada to the oil markets in the Chicago area lies along the Mackenzie river valley. Total distance from source to market is approximately 3,200 miles. A line up the Mackenzie valley could extend to Edmonton where it could connect with existing pipelines which now reach central and eastern North America. Cost of such

an oil pipeline is currently estimated at well over \$2 billion.

A gas pipeline from the Arctic to markets would cover some 2,600 miles. A line to Pacific coast markets would be in excess of 2,100 miles. It is anticipated that only one gas pipeline system would be developed in the 1970's and would require an investment of from \$2 to \$3 billion, depending on route selection and the size of the markets to be served.

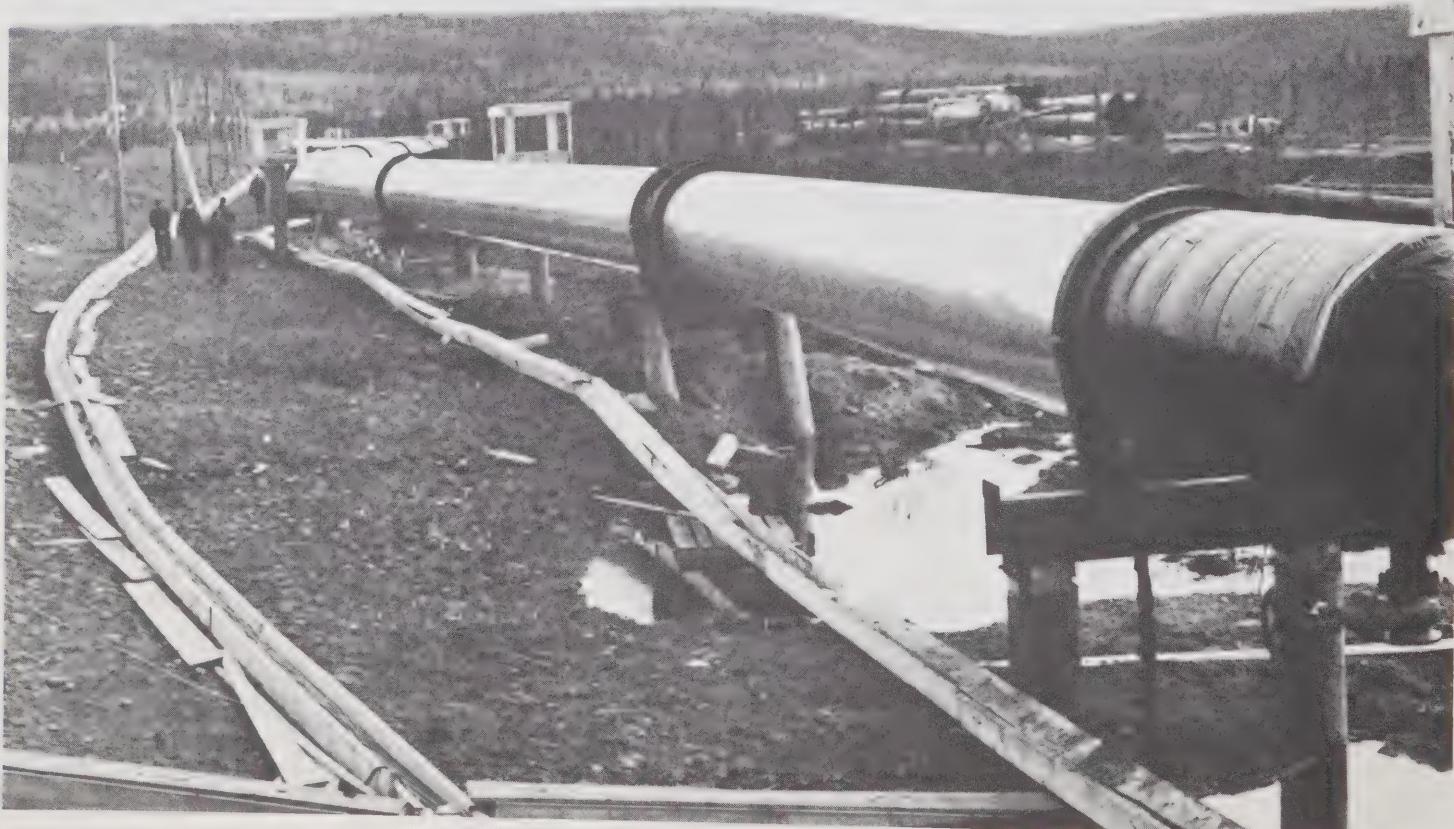
The problems of pipeline transport through the extremely sensitive environment of the Canadian North are highly complex. A consortium of companies, operating as the Mackenzie Valley Pipeline Research Company Limited, is currently studying the feasibility of constructing a 48-inch diameter crude oil pipeline along the Mackenzie Valley route from Alaska. A \$2 - \$3 million research program, which may last as long as three years, began in late 1969.

Testing facilities were constructed at Inuvik, in the Mackenzie delta. They include one loop of 48-inch pipe, 2,000 feet long; one loop of 4-inch pipe, 2,000 feet long; a 5,000 barrel crude oil storage tank; a 1,200 barrel crude oil

storage/heat exchange tank; a 5,000 barrel fuel oil storage tank; a heating unit with a capacity of five million British thermal units per hour plus two heating units with a capacity of one million BTU/hour; and a pump unit driven at 600 RPM by a 270 horsepower diesel, capable of pumping 900,000 barrels per day.

Crude oil obtained from the existing oil field at Norman Wells, in the Mackenzie valley, has been pumped at various temperatures through the 4-inch loop and the 48-inch loop for some time. Temperature measuring devices, some extending to depths of 10 feet, have been installed along the lines and measurements have been made of the effects of heat and weight loading on various materials such as sand, gravel, etc., in the ground underlying the pipe.

The research program also includes an examination of such subjects as the ecology and conservation of the fragile environment, selection of best route, hydrology of streams and rivers to be crossed, logistics of constructing and maintaining a pipeline in the Arctic, housing of personnel and equipment,



A section of the experimental pipeline undergoing extensive tests at Inuvik, N.W.T.

# canada north of 60

pumping station design and construction, and support facilities and communications systems required.

## EMPLOYMENT OPPORTUNITIES

One of the most important guidelines announced by the Ministers concerns the employment of northern residents both in the construction and operation of any pipeline, and in other associated projects, such as development of transportation facilities.

The under-employment of Indian, Eskimo and Métis people North of 60 is of prime concern to the Federal Government, and it may be that all contractors wishing to operate in the North must enter into employment agreements with the Government of Canada and the Governments of both the Yukon and the Northwest Territories, under which the contractors would undertake a commitment to hire local residents and train them on-the-job.

While employment in the construction phase of the pipeline project would be short-term it has been suggested that approximately 150 employees would be required to operate and maintain the pipeline.

While pipeline studies are underway continuing study is being given to the development of water transport from the North to domestic and foreign oil markets. The two trans-Arctic voyages of the 115,000-ton S.S. Manhattan, chartered by Humble Oil and Refining Company, in 1969 and 1970, have provided considerable research data. As a result of these voyages Humble has ordered the design development of ice-breaking tankers weighing 250,000 tons for use in northern waters.

A major shipping problem now being studied is the mooring of super-tankers in the oil-producing areas. The shallow waters of the North Slope near Prudhoe Bay prevent supertankers from moving close to shore. One alternative considered was a terminal in deep water 25-30 miles offshore and connected to the oil fields by an undersea pipeline.

A second alternative is construction of a 250-mile overland pipeline east along the coast and a deep water port in the Mackenzie Delta region.

## northern marketing agency re-organized, re-financed

The Federal Government has undertaken a major re-organization and re-financing of Canadian Arctic Producers Ltd., the Northern Indian and Eskimo arts, crafts and gourmet food marketing agency.

CAP was first organized in 1965 under the sponsorship of the Co-operative Union of Canada and with government support. Annual sales have increased from approximately \$60,000 to more than \$1,000,000 and are expected to increase to \$2,000,000 within three years.

Through CAP Eskimo art has put its way into the major art galleries of Europe and North America. Some 700 dealers in 11 different countries are supplied by CAP. Last year the company provided material for 33 exhibitions of Eskimo graphic art, sculpture and handicrafts.

The interest in Eskimo art has had a marked effect on the northern (native) economy. The Cape Dorset co-operative, for example, recently received a cheque for more than \$170,000.

According to Northern Development Minister Jean Chrétien, under re-organization it is the government's intention to eventually hand over marketing control to the northern co-operatives themselves.



In the interim the government has appointed two trustees, Northwest Territories Commissioner Stuart Hodgson and Sylvain Cloutier, Deputy Minister (Taxation), Department of National Revenue. A nine-man Board of Directors, which includes four northern representatives, will report directly to the trustees.

Under the re-financing program the Department has underwritten \$400,000 in \$1.00 par value seven per cent redeemable preferred shares and is prepared to loan CAP up to \$250,000 over the next two years.

After 1975 CAP is expected to use profits and private financial institutions to finance further growth, repay loans and redeem the preferred shares from the government while the co-operatives will be gradually acquiring the 200,000 shares of common stock in the company.

The immediate effect of the re-financing has been to speed up payments for works of art shipped to CAP's Ottawa headquarters. In the past producers had to ship on consignment and then wait for several weeks or months until a sale was made before receiving payment.

## small business loan fund begins operation

Credit committees are now processing the first group of applications for loans under the Federal Government's new Small Business Loan Fund program introduced to the Yukon and the Northwest Territories.

Under the program each Territory has been provided with \$300,000 for the balance of the current fiscal year, ending March 31, 1971. Additional monies will be allocated for small business loans in future years.

The funds are intended to assist small businessmen who experience difficulty in obtaining capital in the Territories, particularly in the smaller centres. While the maximum amount which may be borrowed under Federal regulations by any one applicant is \$50,000, an initial limit of \$25,000 has been placed on loans within the Northwest Territories to increase coverage of the funds.

The program is financed entirely by the Federal Government but is administered by the Territorial Commissioners, consisting of local businessmen and professional people. The Credit Committees review all applications for loans and provide the Commissioners with fund recommendations.

Under terms of reference established by the Northwest Territories preference will be given to applicants who have been residents for at least one year preceding the date of application, to enterprises to be established or expanded which are fully owned or controlled by residents of the Territories, and to enterprises to be established in communities where no similar facility or service exists at the time of the application.

For purposes of the Loan Fund, a Small Business is defined as one whose gross annual revenue does not exceed \$500,000.

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Members of the National Advisory Committee on Petroleum (NACP) met in the conference room, Department of Indian Affairs and Northern Development, August 13, 1970. Seated in front of the table are Mr. G. E. Rock, President, Husky Oil Ltd., Calgary; J. W. Kerr, Chairman and Chief Executive Officer, TransCanada PipeLines Ltd., Toronto, and Jerry McIver, President, Gulf Oil of Canada Ltd., Toronto. Standing are L. J. Richards, Chairman of the Executive Committee, Hudson's Bay Oil and Gas Company Ltd., Calgary; A. F. Campa, Chairman of the Board and Chief Executive Officer, Petroline Canada Ltd., Montreal; Dr. R. D. Howland, Chairman, National Energy Board; D. E. Mitchell, President, Great Plains Development Company of Canada Ltd., Calgary; E. C. Bouey, President, Northern and Central Gas Corporation Ltd., Toronto; Harry Bridges, President, Shell Canada Ltd., Toronto; and Jack Austin, Deputy Minister, Energy, Mines and Resources.

## arctic islands alive with exploration activities

The movement of men and material through the Arctic Islands this summer as the oil and gas exploration program spread into new areas.

At summer's peak more than 1,000 men were working for the petroleum and transportation industries in the Arctic Islands alone. Six major operators, including Panarctic Oils Ltd., the partnership between the Federal Government and a consortium of Canadian firms, were active in the Archipelago. Panarctic has four rigs at work in various locations.

Exploration companies mobilized a fleet of ships to move supplies to the Arctic Islands in preparation for an expanded exploration program this coming winter.

Panarctic chartered two ships to carry supplies needed for a new drilling program on Ellesmere Island. One, the "Chesley Crosbie" sailed from Montreal with 2,200 tons of freight for the main supply base at Eureka, 600 miles from the North Pole. The Canadian tanker "Edward Simard" carried 1,000,000 gallons of fuel.

King Resources Company of Denver, Colorado, which has 4,500,000 acres in the Islands under farmout from Panarctic, chartered two ships and shared

a third to transport supplies needed in a new seven-well drilling program in the Archipelago. King's base camp is on Bathurst Island. King Resources controls a total of 36 million acres of oil and gas permits in the Islands.

The Danish-owned "Thora Dan", a veteran of Canadian Arctic waters, moved 5,000 tons of cargo from the United Kingdom to Resolute Bay, on Cornwallis Island, site of a new supply depot for the Cardwell division of Bow Valley/Acres/Santé Fe, a Canadian-U.S. consortium. The supply depot will service three or more major operators as well as drilling companies, caterers and other companies. Supplies include casing, mud, cement, bits, dry food, lumber, steel, welding supplies and wireless.

Most of the supplies will be stored in an inflatable building.

Triad Oil Company Ltd., doing exploration work in Vanier, Emerald and Prince Patrick Islands in the Archipelago this season, has introduced into the field a unique mobile exploration camp which, according to company officials will cut the cost of seismic operations in the Arctic Islands by as much as 40 per cent. Arctic seismic surveys average about \$4,000 a mile, compared with \$2,500-\$3,000 in the foothills of southern Canada.

Triad has designed a wagon train which rolls along on huge wheels instead of the conventional tracks which are expensive and heavy to haul. The kitchen, bunkhouses, power and machine shop cabins are mounted on special under-carriages which have storage platforms for supplies. Each unit can carry 20 tons. The 11-unit, 110,000-pound train can be hauled by a single D6 tractor at the rate of about two miles an hour. Should the train encounter any obstacle such as a ridge or coulee each unit can be lifted over it by helicopter.

Triad estimates the new wagon train doubled the cost of the exploration camp, from \$70,000 to \$140,000. However, officials reason that by now being able to work in bad weather the costs per seismic mile can be cut considerably.

For instance, by eliminating one helicopeter in its seismic operations, the company saves approximately \$50,000 a month.

Triad is currently conducting a 400-mile seismic program in the Arctic Islands under an agreement with Panarctic.

**AIRPORT PROGRAM**  
Many of the difficulties experienced by exploration and development companies in moving men and supplies into the isolated regions of the Arctic Islands will be overcome in the near future.

under a new \$5,616,000 Remote Airports Program being undertaken by the Department of Indian Affairs and Northern Development. Some ten airfields will be built in the Yukon and Northwest Territories over the next nine years, of which six will be located in the eastern Arctic.

Construction of the first of these six fields has begun at Pangnirtung on Cumberland Sound, Baffin Island. The Pangnirtung field is expected to be 25 per cent completed by the end of the summer work period and fully completed by September 1971. Initial construction work was undertaken by a crew of 15 military engineers and heavy equipment operators from Canadian Forces Base Winnipeg.

Other fields will be located at Chesterfield Inlet, Pond Inlet, Whale Cove, Igloolik and Cape Dorset, all in the Baffin Island-Hudson Bay region.

Basic runway design provides for gravel strips at least 2,600 feet long and 100 feet wide, suitable for two-engine aircraft. Where possible, the size of the basic field will be increased to 4,000 feet by 150 feet to accommodate large military transport planes.

## businessmen, diplomats tour northern regions

Business investment opportunities in the Northwest Territories were examined this summer and fall by Canadian businessmen and members of the Diplomatic Corps, in Ottawa, at the invitation of Northern Development Minister Jean Chretien.

The tour, arranged in conjunction with the celebration of the Centennial of the Northwest Territories, took the businessmen over the main areas of development in the western regions. For some visitors, it was a return trip to the Territories; for others, it was an introduction to the North.

The group of ten, travelling from June 15-20, toured a number of the primary resource developments, including the silver mine at Echo Bay, on the east end of Great Bear Lake, and the Imperial Oil refinery at Norman Wells. Flying down the Mackenzie river, the businessmen looked at the Arctic pipeline research project at Inuvik, the operation of hovercraft at the Polar Continental Shelf base headquarters

at Tuktoyaktuk, and Imperial Oil's first Arctic oil discovery at Atkinson Point. Other subjects of study included the Agriculture Department's experimental farm at Fort Simpson, the Northern Transportation Company Ltd. facilities at Hay River, Pine Point base metal mining operations on Great Slave Lake, as well as meetings with officials at Fort Smith and Yellowknife.

International interest in Canada's north was reflected by the response of Ottawa's diplomatic corps to Mr. Chretien's invitation to tour the region. The foreign emissaries had a choice of two trips, the first, from Sept. 21-27, included stops at Churchill, Whitehorse, Inuvik, Tuktoyaktuk, Yellowknife, Norman Wells, Hay River, Pine Point and Fort Smith.

The second, from Oct. 5-11, included visits to Frobisher Bay, Resolute Bay, Cape Dorset, Inuvik, Tuktoyaktuk, Norman Wells, Yellowknife, Hay River, Pine Point, Fort Smith and Churchill.

The tours generated enthusiastic reaction among the participants.

"The tour . . . was an unqualified success," commented Gordon F. Bub, Mining Research Department, Burns Bros. and Denton Limited. "Our firm has been active in resource and economic development in Canada for a number of years and we hope to expand our activity in this area. The tour . . . has certainly made us aware of the opportunities that exist in the Northwest Territories."

E. H. Crawford, Vice-President and Treasurer, The Canada Life Assurance Company, added these comments:

"It certainly served the purpose of making one realize the possibilities that exist in the far north for further development."

He added:

"It would be interesting to take the trip again 100 years hence. I am sure that the changes in the next 100 years will be much greater than those that have occurred since 1870."

## mineral assistance program resumed

Applications, on a first-come, first-service basis, are being processed again under the Northern Mineral Exploration Assistance Program. Within two months

of its resumption, on June 22, more than \$600 000 of federal assistance either had been approved or was in the process of being approved in respect of new applications.

A total of \$1,000,000 was made available under the Program for exploration work proposed in the Yukon and the Northwest Territories

Program for exploration work proposed in the Yukon and the Northwest Territories

The Program was suspended in July, 1969 because it was oversubscribed. At that time a total of 71 applicants had received assistance or commitments of assistance for 88 separate programs of exploratory work.



Under the Regulations, assistance may be given to Canadian-held corporations incorporated in Canada and to individual Canadian citizens for exploration programs to begin on or after June 22 or a date following approval of the application.

The following guidelines are used by the Northern Economic Development Branch of the Department of Indian Affairs and Northern Development in processing applications:

1. Assistance in respect of one or more exploratory programs from a single applicant is limited in aggregate to \$50,000.
2. For the southern Yukon (south of latitude 65°) assistance is limited to 20 per cent of the approved cost of an exploration program.
3. For the northern Yukon and for the District of Mackenzie, N.W.T., assistance is limited to 30 per cent of the approved cost of an exploration program.
4. For the District of Keewatin and District of Franklin, N.W.T., assistance is limited to 40 per cent of the approved cost of an exploration program.



MR. RICHARD HILL

## research laboratory attracts students

Dick Hill likes to make the claim that his Research Laboratory at Inuvik contains "the best reference library north of the Arctic Circle." That would probably be true even if there were another reference library north of the Arctic Circle in Canada. The 5,000 to 6,000 books and papers in it provide a broad-brush reference library on the western Arctic, from its pingo to people. It contains all the current technical information about the western Arctic — geology, topography, climate, environment, anthropology, sociology, and is even good on its history. The library is one of the remarkable services provided free by the federal government Laboratory to anyone who wants seriously to study the Canadian north.

Serious students — from the oil industry, universities, government departments, other countries — are so legion that many were bunked out at nights in the halls of the two-storey Lab building this summer. In July, for instance, the Lab supported in one way or another 150 investigators working on 63 projects. The Lab provides laboratories, photographic darkrooms, seminar rooms and other facilities for study in the building. It also helps researchers out on the frozen Beaufort Sea, in the tundra and myriad lakes and streams of the MacKenzie Delta or high in the Richardson Mountains. It provides radio contact for them and re-supply of food and equipment. It arranges for the services of local manual labourers and guides, and arranges to get investigators to and from their destinations. It even provides them with sleeping bags and field camps, on demand.

"When the hotels are full, we have a few waniganas to put people in," says Hill, who is mayor of booming Inuvik as well as manager of the Laboratory, Wanigan? "It's a northern word for a shack on skids," Hill explains. These are spartan affairs, each containing a double bunk bed, desk and chair — purposely spartan, Hill admits, because the Lab does not want to set itself up in the accommodation business

Inuvik, although it is 125 miles north of the Arctic Circle and 60 miles from the Arctic Ocean, has become a very difficult town to get a room in. The Lab's waniganas and even its hallways were constantly in use this summer because the 75 rooms in the two hotels were insufficient to handle the new boomtown traffic spurred by searchers for a Prudhoe Bay of oil on the Canadian side. "Another 60 rooms are being built now (to be completed by mid-September) and they won't be enough," Hill says. Inuvik's population has spurted from 2,500 in 1968 to 3,300 this year, principally because of "Prudhoe mania" lubricated a little by Imperial Oil," as Hill puts it. Imperial Oil Ltd. struck oil at Atkinson Point last January.

Oil Company exploration in the Mackenzie Delta and Arctic coast was at a peak this summer and the Lab was involved with that — it has a full set of topographical maps for the western Arctic, for instance. The Lab provided consultation on the permafrost that goes down about 1,000 feet — how to build gas and oil pipelines on it or run tracked vehicles over it without disturbing too greatly the delicate ecological balance of the north. It helps study what happens to vegetation and

wildlife, and to oil, from pipeline spills in arctic and sub-arctic conditions.

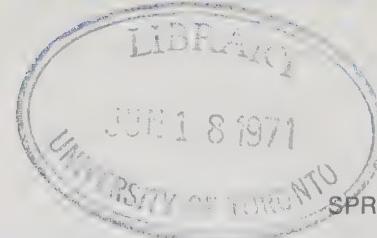
"About 20% of the investigators we assist are in the oil industry and as many more are here to study environmental disturbances," says Hill. In July this year projects listed ranged from arctic archaeology (National Museum) to vegetation regeneration (University of Alberta) to auroral infarsonics (University of Alaska) to permafrost ecology (University of British Columbia), to a wildlife resource study (Canadian Wildlife Service).



The support is provided by Dick Hill, 40, a veteran of seven years at Inuvik, and a staff of four. Hill, a Bachelor of Science (University of Western Ontario) and Master of Business Administration (Harvard), says his function is to be "a manager and expediter of research." The federal government established the Lab, he says, "to help government, industry and universities obtain the best production they can get from scientists in a difficult environment; if you're paying them money, you want productivity."

# CANADA

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newsletter

on resource and economic development  
in the Yukon and the  
Northwest Territories.  
prepared by the Northern Economic  
Development Branch, Department of  
Indian Affairs and Northern Development  
Government of Canada.

### a northern message: people before profits

Opening up Canada's North will not be a solely business proposition. The North must be developed with great attention given to social, cultural and other needs of the people who live in the North. This was the message Northern Development Minister Jean Chrétien brought to Canada's oilmen, who foresee an oil and gas future for Canada's North rivalling that of the Middle East, at the Fifth National Northern Development Conference in Edmonton in November.

Mr. Chrétien told the conference that anyone wishing to operate in the North in the Seventies will have to face the "problems of understanding and problems of communication" that are involved in ensuring that the quality of life for northerners is accorded the same importance as profits for shareholders.

The oilmen talked, too, of involving northerners and of protecting the environment and wildlife . . . as well as of wanting enhanced government incentives to oil and gas exploration and development in the North.

"There is no longer any doubt that oil and gas will be found in large quantities in the Canadian Arctic, that they will be brought to southern markets and that in one way or another this will greatly affect the lives of northern residents," Mr. Chrétien told the conference.

"Confrontation? Yes," the minister said. "Unless we take the necessary steps to deal with the new problems that are arising in the north. Yes, unless we ensure that the Seventies are a decade of balanced and controlled development, a period in which the new economic, political, ecological and social developments in the North can go forward in harmony with one another."

Mr. Chrétien said a prime task for the Seventies must be to establish a new set of explicit national northern objectives (see box on this page).

"If northern development is to have credibility and acceptance by the majority of Canadians," he added, "we must prove that we are indeed involving northern people in this development . . . we have created expectations and aspirations in the minds of northerners and we are now being called upon to do something that will meet those rising expectations and aspirations."

Government and industry must keep northern residents informed as to what is happening in their part of the country — and more than simply informed.

Dr. Arthur Smith, Chairman of the Economic Council of Canada, gave the final and summarizing speech of the conference. He said Mr. Chrétien, Senator Mike Gravel of Alaska and

Senator Ernest Manning of Alberta had all agreed on the same point. It was that economic development is determined "by reconciling conflicting interests and claims on productive resources, by having regard to social, cultural and other non-economic matters as well as economics, by mutually informed and consistent decisions on the part of government and private decision makers, and by placing a strong emphasis on achieving and maintaining a widely acceptable set of goals, principles and ground rules for balanced and orderly progress. Merely to state these demanding prerequisites in general terms is to reveal how great are the challenges facing us in an area like northern development."

Dr. Smith added: ". . . the oil and gas industry may contribute very little to northern development if the essential features of its activities are those of simply importing large amounts of capital, manpower skills and knowledge

### goals for the seventies

This is the North that Mr. Chrétien sees developing in the Seventies, a North created by government and industry and the people who live there working together, a North in which we:

- ". . . ensure the continuous evolution of government."
- ". . . provide a higher standard of living for northern residents, who must have equality of opportunity . . . achieved by methods which are compatible with their own preferences and aspirations."
- ". . . realize the potential contribution of the territories to the social and cultural development of Canada."
- ". . . continue to encourage viable economic development within regions so as to realize their potential contribution to the national economy and the material well-being of Canadians."
- ". . . maintain Canadian sovereignty and security."
- ". . . maintain and enhance the environment, giving due consideration to social and economic development."
- ". . . encourage development of leisure and recreational opportunities."

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into the North and exporting large amounts of products out of the North, with little spillover effects into other more enduring lines of northern development. Now is the time for serious consideration, by industry no less than by government, about broadening the range of studies and initiatives beyond the narrower aspects of the industry's interests and problems to the larger issues that are really involved in northern development."

These issues were identified by Senator Manning as "the meeting of human needs, the provision of rising material standards of living, and the improvement in the quality of life" of those who live in the North.

In December, Yellowknife was the scene of the Arctic Transportation Conference, a joint undertaking of Indian Affairs and Northern Development and the Ministry of Transport.

Both Mr. Chrétien and the Honourable Don Jamieson, Minister of Transport, stressed the need for careful planning of transportation links in the north in order to avoid mistakes made in the south. Mr. Chrétien also warned that steps taken now might be irreversible in the future.

A selection of the papers given at the Transportation Conference is being compiled and will be sent to interested parties.



Mr. David Furlong, managing director of the Canadian Petroleum Association, speaking at the Edmonton Northern Development Conference, said the CPA has estimated the potential reserves in the Canadian Arctic "are staggering, more than 55 billion barrels of oil and more than 300 trillion cubic feet of gas." But he also noted that the average cost of drilling a well in the Arctic today "is perhaps two to three million dollars while the average cost of drilling one in northern Alberta is, say, \$200,000 and in southern Saskatchewan about \$30,000."

While estimates of the reserves in the Arctic and Mackenzie basins varied, everyone termed them immense. "These is no doubt that Canada - North of 60 - is the Grand Banks of North America's oil prospective

regions," said Mr. A. N. Edgington of J. C. Sproule and Associates, Calgary (see table below). He said the North was "one of the world's most stimulating areas for those interested in petroleum developments."

As for the marketing of the hydrocarbons, Mr. William Jamieson of British Petroleum forecast that "in the next ten years more oil will be consumed in the world than has been used in the 110 years since Drake's famous well was drilled in 1859." He sees total world oil demand rising from 42.1 million barrels a day to 80.5 million barrels a day in 1979. He sees United States' consumption, which would provide the major export market to Canada, rising from 13.4 million barrels a day to 20 million barrels a day. Europe, which could be another market for Canada, went from usage of 3.5 million barrels a day in 1959 to 11.4 million barrels in 1969 and is predicted to soar to 21.5 million barrels a day by 1979.

Mr. G. P. Crombie, Vice-President, Exploration, of Panarctic Oils Limited said that at the end of 1969 industry held 564,476,697 acres in northern Canada for oil and gas exploration, more than half the total held in all of Canada (1,032,533,294 acres). He added that "the prospect of oil and gas pipelines through the Territories from the Arctic justifies continuing seismic and drilling operations."

Mr. Crombie said there were 391 exploratory wells drilled to September 30, 1970, mostly in the western Arctic and sub-Arctic. There would be many more drilled this winter in the Interior Plains, at least 25 in the Horn River Basin alone. He expected more in the Norman Wells area, in the Peel Plain area, in the Mackenzie Delta and a quick acceleration in the Coastal Plain-Beaufort Sea area.

In the Arctic Islands, where Panarctic is active, Mr. Crombie referred to the two major gas reserves discovered,

at Drake Point in 1969 and on King Christian Island last October 25.

Mr. Crombie said that in the next five years industry expects as many as 655 wells to be drilled, 75 of them in the Arctic Islands. He expects half the total activity to be in the stretch from Norman Wells to the Arctic Coastal Plain, one third south of Norman Wells and one-sixth in the Islands. He said that industry expected that expenditures on oil and gas exploration for the five-year period 1970-74 inclusive in Northern Canada would be \$650 million.

## king christian well

Although a full assessment has yet to be made, the natural gas discovery at the Panarctic King Christian well is likely among one of the largest in Canada to date.

The King Christian Island well is about 150 miles northeast of the Drake Point gas discovery well on Melville Island. Both wells are owned by the government and private industry consortium, Panarctic Oils Limited.

Gas was reached October 25 at the King Christian well at a depth of 2,010 feet. The well subsequently blew wild and a major fire broke out. A formal government investigation has been launched into the cause of the accident.

Mr. Richard King, senior petroleum engineer, Indian Mineral Lands, DIAND, on loan to the Northern Economic Development Branch will conduct the investigation. Mr. King was previously associated with the Alberta Oil and Gas Conservation Board and is based in Calgary.

The King Christian well was drilled by Commonwealth Hi-Tower Arctic Joint Ventures of Calgary under contract to Panarctic.

## potential oil and gas reserves for Canada's north

|                 | Oil<br>Billions<br>of bbls. | Gas<br>Trillions<br>of cu. ft. | Natural Gas Liquids<br>Billions of<br>bbls. |
|-----------------|-----------------------------|--------------------------------|---------------------------------------------|
| Mackenzie Delta | 20-30                       | 100-175                        | 3-5                                         |
| Arctic Islands  | 80-120                      | 400-600                        | 12-18                                       |
| Total           | 100-155                     | 500-775                        | 15-23                                       |

By comparison, ultimate proved crude oil reserves in the United States to the end of 1969 are about 145 billion barrels. Proved reserves in Canada total about 13 billion barrels. Ultimate proved natural gas reserves to the end of 1969 were 640 and 65 trillion cubic feet respectively.



## mackenzie delta task force

Recommendations on environmental problems associated with resource development contained in the recently published report of the Mackenzie Delta Task Force are being given high priority, according to the Honourable Jean Chrétien, Minister of Indian Affairs and Northern Development.

The 10-man Task Force, composed of university, conservation, industry and Northern representatives, studied the environmental effects of oil and gas exploration on the Mackenzie Delta at the Minister's request last May and, following submission of an interim report, returned to the Delta in July to study summer conditions.

Seismic operations in the North have caused only minimal damage to the environment the Task Force found,

but it did observe that uncontrolled operations conducted on the tundra during the summer could lead to considerable damage.

Mr. Chrétien said that the recommendation calling for the approval of proposed summer operations by a competent local enforcement officer is embodied in his Department's proposed new Land Use Regulations. Also, the recommendation of the Task Force that bulldozer blades be fitted with "shoes" to avoid penetration of the tundra vegetation and soil has been specifically written into the proposed Land Use Regulations.

The Minister went on to say that several other recommendations of the Task Force, such as control of the types of equipment and methods and timing of operations will be salient features of the Regulations.

Although the Task Force found some areas of concern which it recommends should be acted upon quickly, the report says the "self-imposed, very high standards of the major companies currently active in this region, together with their own research and collaboration with private investigators, have avoided serious, extensive damage to

the vegetation and surface of the tundra of this region".

The Minister also agreed with the Task Force's conclusion that effective communication with northern peoples is an important element in departmental activities, adding that a special communications program is being developed to this end.

Wildlife research in the current era of oil and gas exploration is also a vital area of Departmental concern Mr. Chrétien said. Therefore, in June 1970, the Canadian Wildlife Service began to delineate critical areas in the North through a detailed wildlife mapping program. The information gathered by the CWS will be used by the Department in setting terms and conditions under which exploration and development may proceed and will be passed on to the exploration companies to be used in minimizing ecological upsets he said.

In paying tribute to the work of the Task Force Mr. Chrétien said "The group's carefully balanced approach to a most demanding assignment has brought forth a wealth of valuable recommendations that my Department is determined to implement as soon as possible."

*The Mackenzie Delta Task Force, on one of its two field trips to the Western Arctic and Sub-Arctic in 1970 to investigate environmental and social problems. From left: Dr. W. Fuller, University of Alberta; Chief John Tetlichi, former member N.W.T. Council; T. Watmore, Imperial Oil; R. C. Passmore, Canadian Wildlife Federation; Lyle*

Trimble, N.W.T. Council; Dr. J. D. Lambert, Carleton University; Dr. J. C. Ritchie, Dalhousie University; Frank McCall, Regional Administrator N.W.T.; E. M. Lakusta, Gulf Oil. Missing: M. Wapnford, Shell Oil; G. Henderson, National and Provincial Parks Assoc.  
(Photo: Yellowknife Photo Centre)





## harpoon of the hunter

Resolute is not an ancestral place for the Eskimos who live there. They or their people were brought there in the last 30 years from arctic Quebec and other parts of the North. And today, although life is fashioned more around Resolute as a communications and transportation staging point in the eastern Arctic than hunting, they still remember their separate backgrounds among the ice drifts and immensity of black rock. They remember, but remembrance becomes fainter because ways change and nothing was written down.

In "Harpoon of the Hunter", Markoosie draws together the Eskimos of Resolute and of the North in a way that is of this age. Flying a twin-engined Otter over their various nomadic ancestral regions, the first Eskimo commercial pilot looks on the old camps and killing grounds and muses upon

the awful brutality that his people bore from this violent land not long ago. His musings create a novel, a story so spare and unsentimentalized in the telling that it bears the stamp of fact; and Markoosie can write it down. In Eskimo syllabics and again in English, this 28-year-old pilot whose home for 12 years was an igloo, whose settlement had 200 dogs, draws on his own experiences and the tales of elders to write of elemental horror,



gut survival and the dignity that can remain to a man although the land kills him.

Markoosie's book was published by McGill-Queen's University Press in co-operation with the Department of Indian Affairs and Northern Develop-

ment. The Minister, Mr. Chrétien, says "Harpoon of the Hunter" is "a unique and important addition to the growing body of literature being created by Canada's Eskimo and Indian writers."

Markoosie first wrote Harpoon in Eskimo syllabics and it appeared in Inuititut, a DIAND publication for Eskimos which has been preserving the legends, songs, biography, poetry and humour that had come down by word of mouth. Harpoon was Inuititut's first original story written in Eskimo. It ran as a serial and Markoosie was encouraged to translate it into English. Thus, what had been one major step from an oral to a written tradition for Eskimo also became for southern Canadians an accounting of the way life was in the Arctic, told by Eskimos themselves.

Markoosie pilots charter trips for well-known Arctic flyer Weldy Phipps from the airport at Resolute, a busy place for oil and gas explorers, government men, scientists and researchers of various stripes spreading out over the Arctic Islands. He went south to take a flying course at Goderich, Ontario, after elementary schooling in Resolute and high school the best part of a continent away, in Yellowknife. At Yellowknife, he qualified to become a journeyman carpenter.

## northern development appointments

A. Digby Hunt, 43, has been appointed Assistant Deputy Minister (Northern Development) in the Department of Indian Affairs and Northern Development.

Mr. Hunt joined Indian Affairs and Northern Development in 1960 as Administrator of Oil and Gas. He has held appointments as Chief of the Resource Management Division and Director of the Northern Economic Development Branch and was Acting Assistant Deputy Minister from August, 1969.

As Assistant Deputy Minister (Northern Development), Mr. Hunt has responsibility for all departmental regional programs in the Yukon and Northwest Territories. This covers the management of all natural resources including oil, gas, mining, water, surface lands and forests, the protection of the Northern environment, government activities in the field of economic development, and the support of the

Territorial Governments in providing social and other local services. William David Mills, 46, has been appointed Assistant Director, Economics, Research and Planning for the Northern Economic Development Branch of the Department of Indian Affairs and Northern Development.

Mr. Mills was formerly Senior Consultation Officer, Indian Consultation and Negotiation Group in the Department and has held the posts of Executive Assistant to the Deputy Minister, Departmental Secretary, and Director, Consultation and Communication in the Indian Consultation and Negotiation Group.

Mr. Mills was appointed Secretary to the Board of Broadcast Governors in 1959. He joined the Department of Indian Affairs and Northern Development in 1965.

## ncpc yukon appointment

Frank L. Mooney has been appointed Regional Manager, Yukon Territory, for the Northern Canada Power Commission.

Mr. Mooney, 45, has had considerable experience in senior engineering and management positions throughout the North. He will be responsible for all Yukon operations and will have his headquarters at Whitehorse.

## old crow people visit pipeline research project

The dialogue between resource developers and northern native peoples was further advanced in November when 18 residents of Old Crow were flown to Inuvik to inspect the Mackenzie Valley Pipeline Research Laboratory.

The Old Crow Indians, accompanied by officials from the Department of Indian Affairs and Northern Development, were given briefings at the pipeline project and at the Inuvik Research Laboratory.

The good will produced by the trip, along with a mutual exchange of information, should go a long way towards fostering better understanding of human needs as related to development needs in the North according to those present.

## Newsletter

on resource and economic development  
in the Yukon and the  
Northwest Territories.  
prepared by the Northern Economic  
Development Branch, Department of  
Indian Affairs and Northern Development  
Government of Canada.

# CANADA

## north of 60



JANUARY 1972

### Northern land use regulations now in force North of 60

Regulations respecting land use operations in the Yukon and the Northwest Territories have been promulgated under authority of amendments to the Territorial Lands Act passed by Parliament in 1970.

The following regulations, which were published in the Canada Gazette, Part II, November 24, 1971, therefore replace Sub-Section 6-3.1.1—Northern Land Use Regulations, under the LAND section of the Prospectus for Resource and Economic Development in the Yukon and the Northwest Territories:

#### 6-3.1 REGULATIONS

##### 6-3.1.1—NORTHERN LAND USE REGULATIONS REGULATIONS RESPECTING LAND USE OPERATIONS IN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES

#### SHORT TITLE

1. These Regulations may be cited as the *Territorial Land Use Regulations*.

#### INTERPRETATION

2. In these Regulations,  
“Act” means the *Territorial Lands Act*;  
“crossing” means any temporary bridge, causeway or structure or any embankment, cutting, excavation, land clearing or other works used or intended to be used to enable persons, vehicles or machinery to cross any stream, highway or road;

“Engineer” means

(a) in the Yukon Territory, the Regional Manager, Water, Forests and Land Division of the Department of

Indian Affairs and Northern Development at Whitehorse, Yukon Territory, and

(b) in the Northwest Territories, the Regional Manager, Water, Forests and Land Division of the Department of Indian Affairs and Northern Development at Yellowknife, Northwest Territories;

“geophysical survey” means any investigation carried out on the surface of the ground by an operator to determine the nature and structure of subsurface formations;

“inspector” means any person designated as an inspector pursuant to section 27;

“land use operation” means any work or activity on territorial lands that involves one or more of the following:

(a) the use of more than 50 pounds of explosives in any one day or more than 300 pounds of explosives in any 30-day period,

(b) the use, except on a public road or trail, of any vehicle that exceeds 20,000 pounds net vehicle weight or the use of any vehicle of any weight that exerts pressure on the ground in excess of 5 pounds per square inch,

(c) the use of any self-propelled, power driven machine for moving earth or clearing land,

(d) the use of any stationary power driven machine for hydraulic prospecting, moving earth or clearing land,

(e) the use of any power driven machinery for earth drilling purposes, the operating weight of which exceeds 5,000 pounds, excluding the weight of drill rods or stems, bits,

pumps and other ancillary equipment,

(f) the establishment of any campsite that is to be used in excess of 300 man-days,

(g) the levelling, grading, clearing or cutting of any line, trail, or right-of-way exceeding five feet in width;

“land use permit” means a permit issued pursuant to section 20;

“line” means a route used to give surface access to any land for the purpose of carrying out a geophysical survey;

“man-day”, with respect to the use of a campsite, means the use of that campsite by one man for 24 hours;

“Minister” means the Minister of Indian Affairs and Northern Development;

“monument” means any post, stake, peg, mound, pit, trench, or any other object, thing or device used, placed or established for any topographic, geodetic or geographic purpose;



“operator” means a person engaged in a land use operation and includes a permittee and any one employed by a permittee to conduct a land use operation;

“permittee” means the holder of a land use permit;

“rock trenching” means any excavation carried out on a mineral claim for purposes of obtaining geological

information and samples of mineralization;  
“stream” means any lake, river, pond, swamp, marsh, channel, gully, coulee, or draw that continuously or intermittently contains water;  
“Surveyor-General” means the Surveyor-General as defined in the *Canada Lands Surveys Act*;  
“territorial lands” means lands in the Northwest Territories or in the Yukon Territory that  
(a) are vested in the Crown or of which the Government of Canada has power to dispose; and  
(b) are under the control, management and administration of the Minister.

## EXEMPTION FROM REGULATIONS

3. These Regulations do not apply to
  - (a) anything done by a resident of the Yukon Territory or the Northwest Territories in the course of hunting, fishing or trapping; or
  - (b) lands, the surface rights to which have been disposed of by the Minister.

## Part I. General

4. No person shall carry on a land use operation except in accordance with these Regulations.
5. No operator shall, without the prior written authority of the Engineer,
  - (a) conduct a land use operation within 100 feet of a known monument, or a known or suspected archaeological site or burial ground;
  - (b) when excavating territorial land within 300 feet of any stream, excavate at a point that is below the normal high water mark of that stream;
  - (c) deposit on the bed of any stream any excavated material; or
  - (d) when placing a fuel or supply cache within 300 feet of any stream, place the fuel or supply cache below the normal high water mark of the stream.

## EXCAVATION

6. All materials removed by an operator in the course of making an excavation other than rock trenching shall, unless otherwise authorized by an inspector, be replaced and the area of the excavation shall be levelled and compacted.

## WATER CROSSINGS

7. (1) Any material or debris deposited in any stream in the course of a land use operation, whether for the purpose of constructing a crossing of the stream or otherwise, shall be removed by the operator prior to completion of the land use operation, and the channel and bed of the stream shall be restored to their original alignment and cross-section.

(2) Subsection (1) shall not be deemed to permit any person to deposit any material or debris in a stream contrary to section 33 of the *Fisheries Act*.

## HIGHWAY AND ROAD CROSSINGS

8. No operator shall
  - (a) without the prior approval of the Engineer, leave trees, brush, debris or other material, or clear or grade lands or construct ditches on the right-of-way of any highway or road while constructing a crossing over it; or
  - (b) leave the surface, shoulder or ditches of any highway or road damaged or rutted after he has constructed a crossing over it.

## CLEARING OF LINES, TRAILS, OR RIGHTS-OF-WAY

9. (1) No operator shall
  - (a) clear a new line, trail or right-of-way where there is an existing line, trail or right-of-way that he can use;
  - (b) without the prior written consent of the Engineer, clear a line, trail or right-of-way wider than 33 feet; or
  - (c) while clearing a line, trail or right-of-way, leave leaners or debris in standing timber.
- (2) When clearing any line, trail or right-of-way, every operator shall
  - (a) place all cut timber and debris in a windrow; and
  - (b) when making a windrow,
    - (i) place the windrow at one side of the clearing, but away from standing timber,
    - (ii) compact the windrow as tightly as possible by running a heavy vehicle over it, and
    - (iii) at intervals not exceeding 1000 feet, construct breaks of at least 20 feet in the windrow, or place the windrow on alternate sides of the line.
  - (3) Where, in the opinion of an inspector, serious erosion may result

from a land use operation, the operator shall adopt such measures to control erosion as may be required by the inspector.

## MONUMENTS

10. (1) Where a monument is damaged, destroyed, moved or altered in the course of a land use operation, the operator shall

- (a) report the fact immediately to the Surveyor-General the costs of

(i) investigating such damage, destruction, movement or alteration, and

(ii) restoring or re-establishing the monument to its original condition or in its original place, or

- (b) with the prior written consent of the Surveyor-General, cause the monument to be restored or re-established at his own expense.

(2) The restoration or re-establishment of a monument pursuant to subsection (1) shall be effected by a Dominion Land Surveyor under the instructions of the Surveyor-General.

## ARCHAEOLOGICAL SITES

11. Where, in the course of a land use operation, a suspected archaeological site or burial ground is unearthed, the operator shall immediately

- (a) suspend the land use operation on the site, and

(b) notify the Engineer or an inspector of the location of the site and the nature of any unearthed materials, structures or artifacts.

## CAMPSITES AND FUEL STORAGE FACILITIES

12. (1) Every operator shall dispose of all garbage, waste and debris from any campsite used in connection with a land use operation by removal, burning, burial or in such other manner as may be directed by an inspector.

(2) Sanitary sewage produced in connection with land use operations shall be disposed of in accordance with the *Public Health Ordinance* of the Northwest Territories or the *Public Health Ordinance* of the Yukon Territory whichever is applicable, and any regulations made under the applicable *Ordinance*.

13. Where quantities of petroleum fuels in excess of 5000 gallons are to be stored for any period of time or where any quantity of petroleum fuel is to be

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stored for a period exceeding six months, the prior approval of the Engineer shall be obtained with respect to:

- (a) the suitability, soundness and location of the storage container or containers; and
- (b) the design and method of construction of facilities or structures planned, if any, for containing the fuel in the case of rupture or leakage from the storage container or containers.

## REMOVAL OF BUILDINGS AND EQUIPMENT

14. (1) Subject to subsection (2), an operator shall, upon completion of a land use operation, remove from territorial lands all buildings, machinery, equipment, materials and fuel drums or other storage containers used in the course of the land use operation.

(2) An operator may, with the prior written approval of the Engineer, leave on territorial lands such buildings, equipment, machinery and materials as the operator deems may be required for future land use or other operations in the area, but any equipment, machinery or materials so left must be stored in a manner and at a location approved by the Engineer.

## Part II. Land Management Zones

### SETTING APART AND APPROPRIATING

15. The territorial lands described in Schedule A and outlined approximately on the map contained in Schedule B are set apart and appropriated as land management zones.

### APPLICATION

16. This Part applies to the territorial lands described in Schedule A and outlined approximately on the map contained in Schedule B.

### PERMITS

17. (1) Subject to subsection (2), no person shall conduct a land use operation in a land management zone without a land use permit that authorizes that land use operation.

(2) An operator may, in an emergency that threatens life or property, carry out such land use operations in a land management zone as he deems necessary to cope with the emergency whether or not the operations are in

accordance with these Regulations or the operator's land use permit, and the operator shall immediately thereafter send a written report to the Engineer describing the duration, nature and extent of the operations.

### APPLICATION FOR A LAND USE PERMIT

18. (1) An applicant for a land use permit shall submit an application in duplicate to the Engineer in the form set out in Schedule C containing the information required therein.

(2) Every application for a land use permit shall be accompanied by a preliminary plan showing

- (a) the lands proposed to be used and an estimate of their acreage; and
- (b) the approximate location of all

- (i) existing lines, trails, rights-of-way and cleared areas proposed to be used in the lands use operation;
- (ii) new lines, trails, rights-of-way and areas proposed to be cleared or used during the land use operation;

- (iii) buildings, campsites, air landing strips, air navigation aids, fuel and supply storage sites, waste disposal sites, excavations and other works and places proposed to be constructed or used during the land use operation; and
- (iv) bridges, dams, ditches, railroads, highways and roads, transmission lines, pipelines, survey lines and monuments, air landing strips, waters and all other features, structures or works that, in the opinion of the applicant, may be affected by the land use operation.

- (5) Where an inspector makes an inspection under subsection (1), he shall investigate and report to the Engineer particulars of

- (a) the existing ecological balance and physical characteristics of the lands proposed to be used and the surrounding lands;

- (b) any disturbance that the proposed land use operation may cause on the lands proposed to be used and the surrounding lands and the ecological balance thereof; and

- (c) the manner in which the disturbance referred to in paragraph (b) may be minimized and controlled.

- (4) The Engineer shall send a copy of the inspector's report to the applicant.

have the land use operation carried out, where there is more than one holder of that right and they have not entered into an exploration or operating agreement designating one of them as manager of operations;

(b) where no right to search for, win or exploit minerals or natural resources is to be exercised by the carrying out of the land use operation authorized by the permit, be any person who contracts to have the land use operation carried out; or

(c) in any case not provided for in paragraph (a) or (b), be the person who is to carry out the land use operation.

### INSPECTION BEFORE ISSUE OF PERMIT

19. (1) Before issuing a land use permit, the Engineer may order an inspection of the lands proposed to be used thereunder.

(2) The Engineer may require an applicant for a land use permit to provide him with such information and data concerning the proposed use of land by the applicant as will enable the Engineer to evaluate any quantitative and qualitative effects of the proposed land use operation in the area in which the applicant proposes to use such land.

(3) Where an inspector makes an inspection under subsection (1), he shall investigate and report to the Engineer particulars of

- (a) the existing ecological balance and physical characteristics of the lands proposed to be used and the surrounding lands;

- (b) any disturbance that the proposed land use operation may cause on the lands proposed to be used and the surrounding lands and the ecological balance thereof; and

- (c) the manner in which the disturbance referred to in paragraph (b) may be minimized and controlled.

(4) The Engineer shall send a copy of the inspector's report to the applicant.

### ISSUE OF LAND USE PERMIT

20. (1) The Engineer shall, within 30 days after he has received an application for a land use permit made in accordance with these Regulations,

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(a) issue a permit subject to any conditions he may include therein pursuant to subsection 21 (1);

(b) refuse to issue a permit and notify the applicant in writing of his refusal and the reasons therefor; or

(c) notify the applicant in writing that he has ordered an inspection of the lands proposed to be used and state the reasons therefor.

(2) Where the Engineer has notified the applicant that he has ordered an inspection pursuant to paragraph (1) (c), he shall within six months after the date of the application comply with paragraph (1) (a) or (b).

(3) Where the Engineer receives an application that is not made in accordance with these Regulations, he shall, within 14 days thereafter, notify the applicant in writing that his application cannot be accepted and give the reasons therefor.

(4) The Engineer shall give each land use permit a number, and every operator engaged in a land use operation authorized by that land use permit shall display that number on such vehicles and equipment and at such places as the Engineer may require.

### TERMS AND CONDITIONS OF PERMITS

21. (1) The Engineer may include in any land use permit conditions respecting

- (a) the location and the area of lands that the operator may use;

- (b) the time at which any work or activity forming part of the land use operation may be carried out;

- (c) the type and size of equipment that may be used in the land use operation;

- (d) the methods and techniques to be employed by the operator in carrying out the land use operation;

- (e) the type, location, capacity and operation of all facilities to be used by the operator in the land use operation;

- (f) the methods of controlling or preventing ponding of water, flooding, erosion, slides and subsidence of land;

- (g) the use, handling and ultimate disposal of any chemical or toxic materials to be used in the land use operation;

(h) the protection of wildlife habitat; (i) the protection of objects and places of recreational, scenic, and ecological value;

(j) the deposit of a security deposit, in accordance with section 26; and (k) such other matters not inconsistent with these Regulations as the Engineer thinks necessary for the protection of the ecological balance or physical characteristics of the land management zone.

(2) The Engineer may change any of the conditions set out in a permit upon receipt of a written request from the permittee that sets out

(a) the condition or conditions in the permit that the permittee wants changed; and

(b) the nature of the change or changes proposed and the reasons therefor.

(3) Where the Engineer receives a written request from a permittee pursuant to subsection (2), he shall notify the permittee of his decision within 10 days of receipt of the request.

(4) Every land use permit shall state the period for which it is valid and such period shall be based on the estimated dates of commencement and completion as set out by the operator in his application, but in no case shall a permit be valid for a period exceeding two years.

(5) Upon receipt from an applicant of a request in writing for an extension of the duration of a land use permit, the Engineer may extend the duration of that permit, subject to such conditions not inconsistent with these Regulations, as he thinks fit and for such period as he thinks necessary to enable the applicant to complete the land use operation authorized by the permit, but in no case shall an extension exceed one year.

### FEES

22. (1) Each application for a land use permit shall be accompanied by an application fee of \$10.00.

(2) Where the lands proposed to be used for a land use operation, as shown on the preliminary plan, exceed four acres, the applicant shall pay a land use fee for each acre proposed to be subjected to actual use in excess of four acres, of

(a) \$8.00, where he proposes to use lands south of the 65th parallel of north latitude, or

(b) \$5.00, where he proposes to use lands north of the 65th parallel of north latitude.

(3) Where land is to be used for a line, trail or right-of-way, the width of the line, trail or right-of-way shall, for the purpose of subsection (2) be deemed to be 33 feet.

(4) The land use fee referred to in subsection (2) shall accompany each application for a land use permit and shall be calculated on the estimated acreage of lands shown on the preliminary plan and set out in the application.

(5) Within 30 days after the Engineer has received the final plan required by section 24, he shall calculate the land use fee based on the actual acreage of lands used in the operation and shall

(a) where the land use fee paid pursuant to subsection (2) is in excess of the fee calculated in accordance with this subsection, refund the excess to the permittee, or

(b) where the land use fee paid pursuant to subsection (2) is less than the fee calculated in accordance with this subsection, demand, by a notice in writing to the permittee, payment of the deficiency.

(6) Where an application for a land use permit is refused, the land use fee shall be refunded to the applicant.

(7) No application fee shall be refunded.

### PROGRESS REPORTS

23. A permittee shall, within 10 days following the end of each month after the issue of his permit, submit a progress report to the Engineer, in a form satisfactory to him, showing the extent of the land use operations carried out in that month.

### FINAL PLAN

24. (1) A permittee shall, within 60 days after the completion of a land use operation or the expiry of his land use permit, whichever occurs firstly, submit a final plan to the Engineer showing

(a) the lands actually subjected to the land use operation and the acreage thereof;

(b) the location of  
 (i) lines, trails, rights-of-way and cleared areas that were used by the permittee during the land use operation, distinguishing those that were cleared by the permittee and those that existed before the land use operation began;

(ii) buildings, campsites, air landing strips, air navigation aids, fuel and supply storage sites, waste disposal sites, excavations and other works and places that were constructed or used by the permittee during the land use operation;  
 (iii) bridges, dams, ditches, railroads, highways and roads, transmission lines, pipelines, survey lines and monuments, air landing strips, waters and all other features, structures or works that were affected by the land use operation.

(2) The final plan submitted to the Engineer pursuant to subsection (1) shall be

(a) certified by the permittee, or his agent authorized for the purpose, as to the accuracy of  
 (i) locations, distances and acreages; and  
 (ii) the representation of the land use operation; or

(b) drawn from and accompanied by positive prints of vertical aerial photographs or aerial photo-mosaics showing the lands subjected to the land use operation.

(3) Upon receipt from a permittee of a request in writing for an extension of the time for filing a final plan, the Engineer may extend the time for filing the final plan by not more than 60 days.

(4) The Engineer shall reject a final plan if it does not comply with this section and section 25 and the permittee shall, upon receipt of written notice from the Engineer of rejection of the plan, submit to the Engineer another final plan that complies with this section and section 25.

#### LAND DIVISION AND PLANS

25. Every preliminary plan or final plan submitted under this Part shall  
 (a) be drawn to a scale that clearly shows the lands the operator proposes to use or has used;

(b) show the scale to which the plan is drawn; and  
 (c) show locations  
 (i) in accordance with sections 5 to 9 of the *Canada Oil and Gas Land Regulations*, or  
 (ii) by giving the geographic co-ordinates thereof.

#### SECURITY DEPOSIT

26. (1) In order to ensure that the permittee complies with the terms and conditions of a land use permit and with these Regulations, the Engineer may include in the land use permit a condition that the permittee deposit with the Minister a security deposit not exceeding \$100,000, computed at a rate not exceeding \$1,000 per acre, on the estimated acreage of lands shown on the preliminary plan and set out in the application.

(2) Where a land use permit includes a condition requiring a security deposit, the permittee shall not begin the land use operation until a security deposit computed in accordance with subsection (1) has been deposited with the Minister.

(3) A security deposit shall be in the form of

(a) a promissory note guaranteed by a chartered bank and payable to the Receiver General;

(b) a certified cheque drawn on a chartered bank in Canada and payable to the Receiver General;

(c) bearer bonds issued or guaranteed by the Government of Canada; or

(d) a combination of the securities described in paragraphs (a), (b) and (c).

(4) A security deposit shall be refunded by the Minister when he is satisfied that the permittee has completed or discontinued the land use operation and has complied with the terms and conditions of the land use permit and these Regulations.

(5) Where the permittee has not complied with all the terms and conditions of the land use permit or these Regulations, the Minister may refund such part of the security deposit as, in his opinion, the circumstances justify.

#### Part III. Inspectors

27. The Minister may designate as an inspector for the purposes of these Regu-

lations any person who, in his opinion, is qualified to be so designated.

#### DUTIES AND POWERS OF INSPECTORS

28. (1) An inspector may, at any reasonable time, enter any place or premises on territorial lands, other than a private dwelling, and make such inspections as he thinks necessary to determine whether the terms and conditions of a land use permit or the provisions of these Regulations are being complied with.

(2) An inspector shall be furnished with a certificate of his appointment as an inspector and on entering any place or premises pursuant to subsection (1) shall, if so requested, produce the certificate.

(3) Every person in any place or premises entered by an inspector pursuant to subsection (1) shall give the inspector such assistance and furnish him with such information as the inspector may, for the purpose of carrying out his duties under these Regulations, reasonably require him to give or furnish.

29. No person shall wilfully obstruct or hinder an inspector in the carrying out of his duties under these Regulations.

30. No person shall knowingly make any false or misleading statements either orally or in writing to any inspector engaged in carrying out his duties under these Regulations.

#### DEFAULT OF OPERATOR

31. (1) Where an operator fails to comply with section 6 or 7 or subsection 9 (3) or 14 (1) or contravenes paragraph 8 (b) or 9 (1) (c) and does not remedy his default or contravention within 90 days of receipt of a written notice from the Engineer specifying the default or contravention and requiring that it be remedied, the Engineer may take such action as he considers necessary to remedy the default or contravention.

(2) The costs of any action taken by the Engineer pursuant to subsection (1) may be recovered from the operator as a debt due to the Crown.

(3) Nothing in this section relieves an operator from prosecution for any violation of these Regulations.

#### SUSPENSION OF A LAND USE OPERATION

32. (1) Where an inspector is of the opinion that an operator has failed to comply with any terms and conditions of a land use permit or any provisions of these Regulations, he shall inform the operator and, if the operator persists in such default, the inspector shall report the default to the Engineer who may order the operator to suspend the land use operation until the default is corrected and the operator shall thereupon suspend the operation.

(2) The Engineer shall lift a suspension ordered under subsection (1) when he is satisfied that the default has been corrected.

#### CANCELLATION OF PERMIT

33. (1) Where a land use operation has been suspended pursuant to section 32, and the operator fails or refuses to correct a default in complying with any terms and conditions of a land use permit or of any provisions of these Regulations, the Engineer may cancel the assignment of the land use permit.

(2) The cancellation of a land use permit shall not relieve the permittee from any obligations arising under the terms and conditions of the land use permit or under these Regulations or from complying with any notice, direction or order given by an inspector or by the Engineer.

#### DISCONTINUANCE OF A LAND USE OPERATION

34. (1) Subject to subsection (2), where a permittee wishes to discontinue a land use operation at any time prior to the date of completion set out in the land use permit, he shall give notice of discontinuance in writing to the Engineer, indicating the date upon which he proposes to discontinue the land use operation.

(2) A notice of discontinuance given pursuant to subsection (1) shall be given to the Engineer at least 10 days prior to the proposed date of discontinuance.

(3) Upon receipt of a notice of discontinuance, the Engineer shall amend a copy of the permit accordingly and shall forward the amended copy of the permit to the permittee.

(4) The discontinuance of a land

use operation pursuant to this section does not relieve the permittee from any obligations arising under the terms and conditions of the land use permit or under these Regulations up to the time of discontinuance or from complying with any notice, direction or order given by an inspector or by the Engineer.

#### NOTICE

35. (1) Upon receipt of an application in writing for approval of an assignment of a land use permit, the Engineer may approve the assignment in whole or in part.

(2) The application for approval of an assignment shall be forwarded to the Engineer at least 10 days prior to the proposed effective date of the assignment and shall include the permit number of the assignor, the name and address of the proposed assignee and particulars of the interests or rights of the assignee to be benefited by the assignment of the land use permit.

#### APPEALS

36. (1) An applicant for a land use permit or an operator may, within 30 days after any decision, direction or order made by the Engineer or an inspector, appeal therefrom to the Minister.

(2) An appeal referred to in subsection (1) shall be by notice in writing setting forth

(a) the decision, direction or order appealed from;

(b) the relevant circumstances surrounding the giving of the decision, direction or order; and

(c) the reasons for the appeal.

(3) A person appealing to the Minister pursuant to subsection (1) shall provide the Minister with such further particulars with respect to the appeal as the Minister may require.

(4) The Minister may, within 30 days after receipt of an appeal pursuant to subsection (1), set aside, confirm or vary the decision, direction or order appealed from or may remit it to the Engineer for reconsideration with such instructions as the Minister deems proper.

(5) A decision, direction or order appealed from remains in full force and effect pending the decision of the

Minister or an officer appointed by him pursuant to subsection (6).

(6) The Minister may authorize a senior officer of the Department, other than the Engineer, to exercise the Minister's powers in respect of any appeal pursuant to this section.

#### ASSIGNMENT

37. (1) Any direction, notice or order given to a permittee under these Regulations shall be sufficiently given if sent by registered mail to, or left at, the permittee's address as stated in his application for a land use permit and shall be deemed to have been given to the permittee on the date it was so mailed or left.

(2) Where a direction, notice or order is given to an operator other than in writing, it shall forthwith be confirmed in writing.

For additional specific information concerning Land Management Zones and Land Use Permits contact in the Territories:

Regional Director of Resources, Department of Indian Affairs and Northern Development, P.O. Box 1767, Whitehorse, Y.T.

Regional Director of Resources, Department of Indian Affairs and Northern Development, P.O. Box 1500, Yellowknife, N.W.T.

For general information contact: Chief, Water, Forests and Land Division, Northern Economic Development Branch,

Department of Indian Affairs and Northern Development, 400 Laurier Ave. W., Ottawa, Ontario K1A 0H4

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